Transitioning Community Food Systems for Sustainability and a Proposed Caledon Community Food Plan to Foster a Successful Resilient Local Food Economy

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A Major Project

Submitted to the Faculty of Environmental Studies

In partial fulfillment of the requirements for the degree of Master in Environmental Studies

York University, Toronto, Ontario, Canada

Monday July 31, 2017

Abstract

Communities have become a promising place to work sustainability transitions. As the world has become increasing complex, it is no longer possible to use linear thinking to deal with the massive problems facing us. From hunger to obesity to poverty to climate change and inequality, the food system connects us all and it is a productive place to work on these issues. Community food systems are ripe for transition. While the local level has the fewest policy tools and financial levers for change, it is where people are engaged and willing to work on issues that affect them most.

This project explores the theoretical, conceptual lessons form systems thinking and dynamics, complexity science, sustainability transition frameworks and community building. The lessons are further enhanced with lessons from the field. The theoretical and practical foundations are triangulated to develop new transition tools for community food systems to transition to sustainability. These transition tools linked to form a transition pathway for community food systems. Then, using the real life case example of Caledon Ontario, a proposed start at using these tools is investigated and formulated as a way to engage the municipality, business and others in this work.

Foreword

This major project is the culminating task of my Plan of Study as it brings together all areas of concentration into a focused project. From looking broadly at *Food Systems* to understanding *Levers of Change* and *Transition Pathways* in these systems, to applying this knowledge and diving deeper into how *Community Food Strategies* can work to help solve sustainability issues, this project is not only embedded in my Area of Concentration, but it links them together for a logical actionable conclusion. This project will complete the objectives set out in my Plan of Study, especially the final objective to work with a community in Southern Ontario to apply a sustainability transition framework through development of a Community Food Plan.

This research project is guided by the following problem or 'wicked question'. How can innovation drive change for communities (individuals, government, business and CSOs) to transition their current food system to one which is healthy, ecological, equitable and financially viable and balance these attributes with efficiency and economy while not producing negative externalities?

This major paper embraces why I returned to school – to work smarter and strategically, not just harder. I am passionate about making sustainable food system change at all levels, but in particular at the community level. At the same time, I have become captivated by the idea that we can use theoretical knowledge on systems, innovation and sustainability transitions to inform what we are doing out in the world every day. And, that when we do this, it will result in positive and deep change that benefits all including the earth.

My Plan of Study was purposefully designed to focus on three main areas: (1) food systems; (2) innovation, levers of change and transition pathways; and, (3) community food strategies. Early on these were the areas I believed would be crucial in food system transition. I took courses during the MES program specifically designed to build my knowledge in food systems (ENVS 5011 Food Land and Culture and ENVS 6172 Food Policy Development in Canada), systems thinking (ENVS 4523 Systems Thinking in Environmental Studies: Theory and Methodologies), neo-tropical and marine food systems (ENVS 6399A Field Workshop on ES: Costa Rica and ENVS 6599A Marine Conservation, Citizenship and Sustainability Strategies: Experiential Field Course in British Columbia), policy/health/economics (ENVS 6136 Health and Environment, ENVS 6115 Ecological Economics, ENVS 5164 Environmental Economics, ENVS 5178 Environmental Policy I-Ideas, Institutions and Interests, ENVS 6178 Environmental Policy) and diversity (ENVS 4215 Globalization & Indigenous Peoples).

My course work was supported by on-going field experience through pre-existing paid and volunteer roles in the community. I worked with local food and farming businesses and community groups through Eat Local Caledon (Caledon Countryside Alliance. I worked with Sustain Ontario as a Co-Chair on the 2013 Local Food Act. I worked with the Headwaters Food and Farming Alliance team as a project consultant on the 2017 Headwaters Food Charter and Action Strategy. I was the project and research lead for Headwaters Communities in Action on the *Community Priorities in Headwaters 2016: Increasing Community Well-Being and Resilience*. Finally, as a founder, board member and board chair of Albion Hills Community Farm, I learned first-hand how to run a food social enterprise, community garden and education organization for the Caledon, Ontario.

Acknowledgements

It takes a village to raise a child and like raising a child embarking on an education journey later in life takes a village as well. I am endless grateful to all who have encouraged me, enriched the journey and supported me on a regular basis.

York University has been an incredible stop on my food system journey. I was continually inspired by my professors, fellow students and the work. I can honestly say that I enjoyed going to class and having the luxury of spending time learning something new that I am passionate about. Delving into understanding and finding solutions has not only enriched my food system work, but it has a priceless effect on how I do my work. I wish there was an easier way to transfer this to my fellow practitioners. I want to first thank my initial advisor Peter Victor who does leading edge work in his field of economics. It is because of his influence that I was able to complete a local study on community well-being and understand why community capital assets should be included in the model. I was inspired by the work of the professors at York including Felipe Montoya-Greenheck, Leesa Fawcett, Mark Winfield, Martin Bunch, Ravi De Costa, Peter Victor and Liora Salter. I found a new community of friends who I shared this time with and I was inspired by their work and appreciated their support.

My strongest thank you goes to my MES Supervisor and Mentor, Rod MacRae. He is an inspiration and a legend to all of us who do food system work. He is patient, measured, intelligent and an asset to York and the food system. I appreciate Rod putting up with my long time frame as family, work and life happened and got in the way of completing the work at hand.

I want to thank all my colleagues over the years that have really inspired this work and help shape these ideas; from Nicola Ross to Wayne Roberts and Lori Stahlbrand, to Kasey Livingston to Jen Clark to Barb Imrie to Shirley Boxem and Sylvia Cheuy. Not to forget those I worked with at Sustain Ontario, Local Food Plus, Albion Hills Community Farm, Headwaters Communities in Action, PAAWG and so many others.

Finally, I want to acknowledge and thank my family. They have patiently waited for me to finish this degree and to fix the food system. They have always been involved in the numerous food events I commit to. They know I always put them first. Thank you Rich for editing, supporting and standing in when I was away or finishing work. I truly appreciate you interest in my work and your love and support. Thank you Alex and Katie for engaging in the food system and being patient when I had to finish different parts of this school work. I hope you will understand some day and be able to pursue all your own education dreams.

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Chapter One: Introduction to Major Research Project

1.1 Project Overview

This project explores transitioning local community based food systems to sustainability using a normative research approach. Based on the concepts of systems thinking and complexity science, using prevalent sustainability transition theories and grounding these in existing transition experiences, the project formulates a methodology for managing community food system transitions. Specifically, the following four transition tools are proposed and developed to help guide transition:

- an innovation ecosystem to help incubate transition;
- community food ideas to lead transition;
- overarching design principles to guide transition; and,
- transition pathway mapping.

Then, this process is applied to a small southern Ontario community in *Part II: A Community Food Plan for Caledon*.

1.2 Researcher's Role in Project

This project emerges from my work and my life story. Growing up in a farm community on a dairy farm in Caledon, the first thing I wanted to do after planning school at the University of Waterloo was embrace urban living. Then with two small children and having lived in Toronto for a number of years, I felt the country calling me back. Our family move back to Caledon was partially so that I could explore how farming could fit into our lives. I quickly learned that the food system I saw myself as part of, did not yet exist. With my colleague Nicola Ross, I embraced my first assignment at the Caledon Countryside Alliance

to help organize the "first" local food conference the Toronto Food Policy Council (TFPC) was hosting in 2003 at Montgomery's Inn. At the conference, many people said that everybody who was involved in local food at the time in Southern Ontario was in the room. From this initial conference, I was also involved in organizing the subsequent conference spearheaded by the TFPC from 2004 until 2009 when Sustain Ontario started taking on this work. It became the precursor to their biannual *Bring Food Home Conference*.

Early on, I realized I wanted to work in the **local** food system. I knew I couldn't make a big difference taking on international trade agreements, big agricultural and big food companies. I am passionate about dealing with farm viability, the environment and human hunger and health. I simply have never been able to understand why someplace can have so much abundance along with hungry children and poor farmers. Local was the sweet spot to do this work; the place in the food system that I could have the most effect and actually help make change happen.

My immersion into the local food movement happened quickly and before I knew it, I was involved in a number of initiatives including: a member of the Peel Agricultural Action Working Group (PAWWG) (2005); Executive Director of Caledon Countryside Alliance (2004-2017); a founding board member of Local Food Plus (2005); founder member of Grown in Peel Guide group(2005); Peel Federation of Agriculture (farm member 2007 to 2017 and Director 2008 to 2011); co-founder of Eat Local Caledon (2007); founding member group (2007) and then co-chair (2010-2015) of Sustain Ontario; co-founder of the Inglewood Farmers' Market (2009); and, founder member group (2009) and board of directors (2010-2017) of Albion Hills Community Farm. At the same time, my family and I were getting the full farm experience as we managed our family farm in forage crops,

experimented with chickens and transitioned the farm to organic (certified) through Demeter Canada. With these rewarding activities and local food accomplishments, I realized that I couldn't work harder, but that I needed to work smarter.

This led to a return to school in the fall of 2012 to summer 2013 for the Graduate Social Innovation Program at the University of Waterloo; it was the perfect blend of academics for practitioners and for that year, one of two focus areas were food systems. The program brought the class (a mixed group of government, business and civil society organizations professionals from across Canada) together four times during the year for about a week each time. Between sessions, we were introduced to thought leaders and academic study through essays. This is where I was introduced to systems thinking, complexity science and sustainability transitions.

As part of a group project, (The SSK Group - Sarah Grant, Sylvia Cheuy & Karen Hutchinson), we developed a social innovation strategy focused on *Creating Diverse and Efficient Locally-Based Ontario University Food Systems.* In this project, we recognized four levers of change (networks, information, finance and policy) in university food systems. (Grant, Cheuy, & Hutchinson, 2013) This project formed the start of my thinking on how to change community food systems.

I quickly realized that I could work smarter, but I still needed to learn more. York University's Master of Environment Program's unique format appealed to me as it allowed and encouraged a specialization in community food systems. Being able to design a program around my personal education objectives was the ideal landing spot and I jumped right in after the social innovation program was finished in 2013. Over the last four years, it

has proven to be exactly what I needed. I wish all food system practitioners had the advantage of learning what I have at York.

While at York, I have continued to do much of the same volunteer community work, although some projects concluded and some ramped up. In 2014, I became a project consultant for Headwaters Communities in Action (HCIA). As a backbone organization, HCIA supports Headwaters Food and Farm Alliance (HFFA) in their food work, allowing me to continue to be involved in local food system work. In 2017, I was a proud member of the team that helped to produce the Headwaters Food Charter and Action Strategy. As the project lead for the Headwaters Community Well-Being Project, I learned a great deal about genuine measures of progress and the relationship between pillars, indicators and data measurement points. I also learned about the importance of community engagement at all levels to help build community ownership.

At the same time, over the past ten years, I have watched many local food businesses and community programs be launched and mature. I have talked with operators and community animators and have seen the glint in their eyes as they talk about the possibilities. It seems hard to imagine the food system I moved back to over ten years ago compared to today. As a representative of Sustain Ontario, I had a ring side seat when the Local Food Act (2013) was being negotiated. I now know that we could have been better prepared, even though we were really excited the government was doing something about food.

Being an 'insider' in the food system I am trying to analyze and change makes this project easier on many levels; I have developed valuable insight into how community processes work and how things can get done. At the same time, I am trying to be purposeful

about stepping back at times to see the project as an 'outsider'. This is particularly relevant during development of the Community Food Plan for Caledon.

Being an insider, being a practitioner and being a new academic, has brought me to this point where I can embrace and digest academic knowledge. This, combined with my "field" knowledge, will produce a valuable and useable contribution for the community I work with but also to others. That is the true aim of this project; to uphold the academic tradition of producing something to add to the body of research and at the same time to produce something positive that can be used to move community life forward.

1.3 Project Research Process

Transitioning the food system to sustainability is a complex problem that can be viewed from many different perspectives and levels. This research project is unique since it brings together multiple different strands of the problem (for example, systems thinking, complexity science, social innovation, sustainability transitions and community food systems) to dive deeper into the system in search of solutions with greater impact. The intended result of this research is based on a systems-thinking approach to the development of community food transition framework and plan that can be taken out into the community. While other communities have prepared food assessments, food charters, food strategies and implementation plans, and many have adopted a system-thinking approach; this plan is intended to be different. Many scholars have researched different parts of this problem, but no one scholar has adopted this exact research direction. As a result, there is a literature gap and/or lack of specific 'out of the box' frameworks to evaluate or apply, resulting in a normative action research direction for this project.

This project is designed around a normative action research process to facilitate the project goals of bringing together different theories, concepts and case examples to inform construction of a future framework and plan that is actionable or can be used in a community. To converge on the problem of transitioning community food systems to sustainability, the research design includes 'triangulation' of system thinking, innovation, sustainability transitions and community food systems.

The "action" part of the research is not used in the traditional sense. The action is based on knowledge and experience from being embedded in the local food system in Ontario over the last ten plus years and then using that foundation to build on. As part of a community building role, this is an on-going iterative process. In addition, the "action" is also reflected in the fact that this research will go back to the Caledon community and others as a transition tool.

Baburoglu and Ravn suggest that "…action researchers should adopt the normative planner's concern with creating images ('theories') of desirable futures and a constructivist epistemology according to which social reality is constructed through human activity" (Baburoglu & Ravn, 1992, p. 19). The process envisioned for this research is conceptually the same as their summary of action research as follows:

> "The task of the action researcher is to refine and improve the generalizability of the theory by encouraging others – beyond the stakeholders with who it originated – to adopt, test and, if necessary modify it. Thus, the researcher's scientific efforts (testing the theory's generalizability) are no different from her/his social or professional work (helping people to achieve desired ends). The world of values and the world of science are brought closer as the twin concerns of action and research are understood to be one movement of developing our capability to act and construct desirable social/organization realities." (Baburoglu & Ravn, 1992, pp. 31-32)

They continue to state that the key to normative planning and action research is the process of collaborating to search for common ground on which future theories can be generated. “This methodology is particularly helpful when the certainties of the past and the present cannot be assumed to hold true for the future, and searching for casual links in the past will not shed light on the nature of reality in the future” (Baburoglu & Ravn, 1992, p. 32).

This research did not involve direct collaboration with a wider group or primary data collection for two reasons. First, I have been embedded in food system change in Caledon and Ontario for over ten years, I have continued during this research project and I fully expect to continue at the conclusion of the project. As such, this research draws on the on-going ‘action’ and ‘collaboration’ gleaned from my time as a practitioner. As part of this project and to provide guidance on the action research component, I have journaled reflections on my embeddedness in food system work that is concurrent with this research. Second, I will apply an action research lens to reviewing secondary material; material that has already been collected with extensive stakeholder input and collaboration across sectors. There are a number of critical research documents prepared for both Caledon and Headwaters Region (Town of Caledon and the County of Dufferin) including the recently completed Headwaters Food Charter and Action Strategy. In each case, this material will be reviewed and synthesized with a normative research approach to develop a ‘what could be’ innovation framework and food plan for presentation to the community at project completion.

1.4 Project Research Methodology

This project consisted of two distinct but mutually dependent research methodologies which can be classified as Part I (Understanding Community Food System Transition to Sustainability) and Part II (Community Food Plan for Caledon).

Theory and Concepts	**Field Examples**	**Transition Tools**
Theoretical and Conceptual Underpinnings Food Systems System Thinking Complexity Science System Transition Dynamics Places to Intervene Adaptive Capacity, Adaptive Cycle and Panarchy Resilience and Diversity Scale Keystone Species Role of Innovation Modelling Complex Systems to Integrate Ecological, Economic and Social Theory Sustainability Transition Frameworks ESR Framework Multi-Level Perspective Deep Transition	**Lessons from the Field** Municipal Policy Entrepreneurs (Toronto, Thunder Bay and Golden Horseshoe Food and Farm Alliance, Calgary, Headwaters) Design Labs: Ontario Tender Fruit Lab European Projects: Farm Path, Food4Sustainability and Switzerland Vermont Farm to Plate Carlton Connect Initiative ABCD Community Development	**Proposed Transition Tools** Community Food Assessment and Asset Mapping Design Principles Innovation Ecosystem (Collaboration, Social Innovation, Policy, Economics/Business, Technology, Measurement) Community Food Ideas Transition Pathways Community Food Plans

Figure 1 Research Methodology Logic Model

The goal of Part I was to develop a working understanding of the theories and concepts from system thinking, complexity science, system dynamics, innovation, and sustainability transitions while at the same time looking at live examples of food system and system change happening in communities. To converge on the problem of transitioning community

food systems to sustainability, the research methodology includes 'triangulation' of system thinking, innovation, sustainability transitions and community food systems.

This research builds on both the work from my Graduate Diploma in Social Innovation and my course work in this Master's Program. Working from this foundation, a literature review was conducted for relevant research and case studies on both the theoretical foundations and actual food system change in the community. This review was conducted on an on-going basis from fall 2013 to June 2017 with the guiding principle of following relevant journals and researchers who are active in the field and examining the earlier work of others. The following research and researchers were of particular interest:

- The earlier work of C.S. Holling and his colleagues;
- The work of Donella Meadows on system thinking;
- The work of Stuart Hill and Rod MacRae on sustainability transitions;
- The work of Frances Westley, Brenda Zimmerman and Michael Quin Patton on social innovation, complexity and evaluation;
- Those active in the Sustainability Transitions Research Network (STRN) with particular interest *in Frank Geels, Johan* Schot for sustainability transitions;
- Food projects – farm path, food for sustainability, IPES Food, specific City food system change work (Toronto, Thunder Bay, Calgary and others)
- Innovation ideas from the Resilience Alliance, the food system and from the Information, Communications, and Technology (ICT) sector, as well as what communities are doing around innovation.

The goal of Part II was to develop practical tools for use by communities to transition their food systems to sustainability, create transition pathways and community food plans and then to blend live information from an actual community with these tools. Case study information was brought in from other communities to build understanding and examples of community food system change. This work was normative and developmental and it built on the methodology of 'triangulation' of system thinking, innovation, sustainability transitions and community food systems from Part I.

Four different information source groups informed both parts of the project. The first group of sources came from academic research on systems thinking, innovation and sustainability transitions. The second group came from promising case examples of food system and community food system change which are more from the field of action research. The third group came from information and food and farm plans from Caledon. The fourth source was guided by and builds on the results of the previous three sources to generate transition tools and a community food plan process.

Finally, the focus of this project around a normative action research process has facilitated the project goals of bringing together different theories, concepts and case examples to inform construction of transition tools and a community food plan that is actionable and available for community use.

1.5 Project Research Goals and Objectives

The overall goal of this research was to triangulate systems thinking, innovation, sustainability transitions and community food systems to develop a process for transitioning to sustainability. This research inquiry was guided by the following problem or 'wicked question':

How can innovation drive change for communities (individuals, government, business and CSOs) to transition their current food system to one which is healthy, ecological, equitable and financially viable and balance these attributes with efficiency and economy while not producing negative externalities?

To answer this question and to move towards potential solutions, a number of research objectives have been identified:

- develop an understanding of how to intervene in a system for positive change and learn how to transition that system based on theoretical underpinnings and community experience;
- use normative action research to develop transition tools to help community food systems transition to sustainability
- develop specific tools around innovation (specifically in collaboration; policy; economics/business; technology; social innovation; and, measurement), transition pathways and community food plans
- apply these tools to a community in Southern Ontario (Caledon) to guide the plan development and ground it in a real situation, thereby enhancing learning and truly making the process iterative.

It has been the aim of this project to contribute to the on-going research in food system thinking, sustainability transitions and innovation. Specifically, it is hoped that the transition tools will be useful not only to Caledon but also to other communities. Furthermore, hopefully this project will generate further conversation on how all communities can dig deeper into their food systems and work to transition to sustainability.

1.6 Research Project Paper Structure

This research paper is organized into two parts. Part I focuses on understanding community food system transition to sustainability. Chapter One introduces this section and defines the problem area and why it is important. Chapter Two details the theoretical and conceptual underpinnings relevant to this research including system thinking and transition, transition to sustainability, design thinking and community building. Chapter Three brings together lessons from the field that highlight those engaged in various forms of transition. Chapter Four proposes transition tools for community food systems including developing design principles, nurturing innovation ecosystems, determining community food ideas, mapping transition pathways and preparing a community food plan. Chapter Five summarizes how to foster community food system transition to sustainability.

Part II is a Community Food Plan Rationale tailored for Caledon, but one that could be used for any community. This part of the project uses the transition tools along with community research to develop the rationale for the plan. It is a short graphic interpretation of why a plan should be created and why it will have broad appeal for government, business and community stakeholders. The plan begins with an executive summary. Chapter One introduces the Town of Caledon and the opportunities for community food system transition. Chapter Two present the transition tools designed for discussion and motivating the community to embark on a transition process. Chapter Three details a report template for the work.

Part I: Understanding Community Food System Transition to Sustainability

Chapter One: Introduction

The purpose of this research project is to apply a systems-oriented thinking and sustainability transitions approach to community food systems. Part 1 of this paper builds understanding of community food system transition to sustainability by presenting the theoretical and conceptual underpinnings of transitioning alongside existing examples to serve as development for the suite of proposed transition tools. Specifically, Chapter Two examines food systems and why they are a place to work on sustainability. Chapter Three summarizes the findings of this research across theory and concepts and brings it together with lessons from the field in Chapter Four. Chapter Five presents a normative research approach to developing four sustainability transition tools for community food systems. Then Chapter Six summarizes the normative framework for fostering community food system transition to sustainability.

Chapter Two: Food Systems

2.1 Introduction

The purpose of this chapter is to introduce; the position and understanding of food systems in this research based on the development of the current food system in Ontario, the definitions of a food system and a community food system and explain why food systems are a place to work on sustainability.

2.2 Development of the Current Food System

While food systems have been around since the dawn of civilization, the roots of our current complex global food system can be traced back to colonization. Friedman has written on how researchers have examined the capitalist world-system through a food lens beginning with the 1840s policy decision by the British government to sacrifice its own farmers for cheaper imports of wheat, meat and dairy. This was the first time since the Roman Empire that a government felt confident enough in its world control to compromise its food (Friedman, 2012, p. 20). Sadly, this situation has only escalated as more countries have been drawn into the idea of risking the food supply of their people to depend on the global food system. Again, Friedman writes about the first 'world food crisis' that happened in 1972 to 1973 when the prices of soy, maize and wheat price doubled or tripled. High food prices, hunger and Third World country dependence on food imports set up this crisis. In the end, not farmers but corporations active in international trade profited and the world of food became 'unstable and unpredictable' (Friedman, 2012, p. 17). Soon after, the United Nations World Food Programme (WFP) was founded in 1974 with the purpose to promote food security through multilateral food aid (Friedman, 2012, p. 17).

Food insecurity became a problem throughout the world and in response new organizations like Via Campesina (with a new goal of food sovereignty) began. In Ontario, food banks (1980s) and organizations like Foodshare (1985) and the Toronto Food Policy Council (1990) started. In conjunction with the quantity issues, quality of food also became important in the 1970s (Friedman, 2012, pp. 17-18). Fast forwarding to today, these same organizations and others are still trying to deal with similar food quantity and quality issues, and these problems have become increasingly complex with the addition of compounding environmental, social, security and many other issues around food. At the same time, we still have the same problems with insufficient food quantity and quality across the world.

At the same time, the changes begun by colonization in the 1800s, took root and developed into the corporate global food system. "New corporate sectors have become powerful (Friedman, 2012, p. 22)." This power is reflected across the whole food supply chain including everything from seeds to animals to inputs to processing to distribution and retailing. It is a strong global powerhouse controlling most parts of food and agriculture and proposing technological solutions to the food quantity and quality issues.

This production system developed as much of the world went through an 'economies of scale' revolution leading to reduction of biodiversity, scaling up monoculture and finally genetic enhancement of seeds and livestock breeds and bringing us up to today where ten crops account for three-quarters of humanity's plant-based calories and five livestock animals are responsible for virtually all meat, eggs and milk consumed on a global scale. This has been achieved by producing cheap food with a focus on the industrial

grain-oilseed-livestock complex or the productive foundation of the food system in the United States, Canada and other temperate countries (Weis, 2012, pp. 106-107, 118).

All these factors have contributed to what is termed the 'hidden environmental costs of cheap food' in industrial capitalist agriculture including food miles, soil mining, fertilizers, pesticides, GMO risks, factory farms and feedlots, downstream pollution burden, freshwater diversions and over-consumption, reverse protein factories and the loss of biodiversity (Weis, 2012, pp. 108-114).

Thus, bringing us to today where there is an abundance of civil society and philanthropic organizations working on the issues of quality and quantity of food. Governments are increasing spending to deal with rising health care costs and financial support for the conventional farm sector. The corporate global food machine is making unprecedented financial returns, but not paying for the hidden environmental and social costs of the cheap food system. And, finally the world needs to find a way to solve the food system 'horns of dilemma' which is how to achieve an overall balance between a fair food system for all on a healthy planet that returns positive social, environmental and economic benefits *with* limited negative externalities generated by the food system.

This food system history review has been important to understand how the current system developed and the historic factors or feedback that locks it into place. This facilitates a better understanding of the system for the upcoming sections.

2.3 Definition of a Food System and a Community Food System

A food system can be defined to include production, processing, distribution, access, consumption and waste. Delving deeper into connecting sustainability and community food systems the following definition applies:

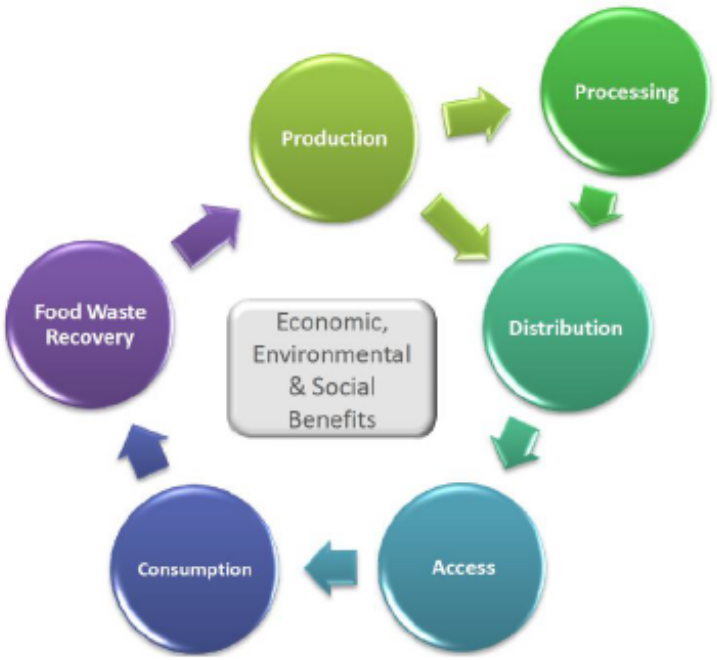
> "A community food system is a food system in which food production, processing, distribution and consumption are integrated to enhance the environmental, economic, social and nutritional health of a particular place. A community food system can refer to a relatively small area, such as a neighborhood, or progressively larger areas – towns, cities, counties, regions, or bioregions… but by including the word 'community' there is an emphasis on strengthening existing (or developing new) relationships between all components of the food system. This reflects a prescriptive approach to building a food system, one that holds sustainability – economic, environmental and social – as a long-term goal toward which a community strives." (Cornell University, Division of Nuitritional Sciences, Discovering the Food System, 2013)

This definition gives an explicit role to not only the components of the system, but also to the relationships and community within the system. Further, it describes a system which holds economic, environmental and social sustainability as the result, as a prescriptive approach and as an iterative goal.

The City of Calgary has defined their sustainable food system components to include six components: production; processing; distribution; access; consumption; and, food waste recovery as detailed in Figure 2 below.

Production: refers to the planting, growing, raising and harvesting of food, including urban and rural agriculture.

Processing: refers to the process of altering raw food stuffs to create a different, more refined product. Examples include preserving, cooking, baking, preparation, meat processing, grain milling and other value-adding operations at a variety of scales. All these changes require the use of energy and natural resources. Reasons for processing include the need to manage harvests, reduce waste, keep food safe and protect public health, improve palatability, feed large urban populations and feed rural and remote communities.



Distribution: refers to the distribution and storage of both raw and processed food and the retailing, wholesaling and purchasing of food products. This takes place from farms to grocery stores, markets and restaurants. Energy and natural resources are used both in the packaging process and in the transport of both the food and the packaging materials to the places where packaging is completed.

Access: refers to the accessibility and affordability of food in addition to the preparation of both raw and processed food products. This takes place from the farm to grocery stores, to farmers markets, to restaurants, to communities and households. People purchase food based on family need, accessibility, food preferences, cultural background, religion, nutrition, values, attitudes and beliefs related to food and food advertising. Food choices are made within certain constraints such as money available to buy food, time available to shop for food, time available to prepare and cook food, skill and confidence in food preparation and cooking, facilities available in the home and access to shops and transport, likes, dislikes, allergies and cultural factors. Choices are also limited by the food supply.

Consumption: refers to the act of consumption and enjoyment of food. This can include food-related events and eating in both the public and private realms. Being able to select, prepare and cook minimally processed food from low in the food chain enables families to enjoy making healthy food choices, achieve good nutritional value for money, increase control over what they eat, understand where food comes from, begin to appreciate the important role of food producers in our society and contribute to protecting the environment. Preparing and sharing food also plays an important role in developing family and community relationships.

Food Waste Recovery: refers to the diversion, management, and utilization of organic waste e.g. as an energy source and fertilizer using recycled nutrients. Recycling and reusing of food matter provides a valuable resource when considering food choices within the framework of the food system.

Figure 2 City of Calgary's Sustainable Food System Components
(Calgary Eats! Calgary Food Assessment and Action Plan, 2012, p. 16)

Unlike others, Calgary's adds access as a component and embeds economic, environmental and social benefits at the centre of the system. This recognizes that access to food and food preparation are part of the system and it puts sustainability at the centre of the food system. This sustainable food system definition will be used as a foundational baseline for this research project. .

With large scale, society-wide sustainability issues, it is important to find a place to work and start. This research focuses on community food systems as that place. Recently, communities have been at the centre of environmental and social action as they have championed climate, pesticide and food issues by being in close proximity with decision makers in government, business and civil society organizations and to citizens. These efforts can potentially be scaled up to larger areas (regions, provinces or nations) or scaled out to other systems (transportation and energy) offering even greater potential for change toward societal sustainability. As international, national and provincial governments have failed to step up to the plate on food and sustainability issues, communities have filled the void to offer opportunity for further action.

While food systems are complex and interrelated through policies, economy and food system actors, across scale, recent reports and activities by municipalities across Canada indicate that community food systems are becoming a hotbed of activity. A 2013 report states that cities are food players. At that time, more than 64 municipalities were engaged in food policy and practice. Not only is this number expected to increase, but the level of involvement is expected to deepen. Further, as 'food policy entrepreneurs', municipalities and their staff are using food to make progress on health, social environmental and economic objectives. (MacRae & Donahue, Municipal food policy

entrepreneurs: a preliminary analysis of how Canadian cities and regional districts are involved in food system change, 2013, p. 30). Of particular note is that municipalities are becoming the place to work on large scale global sustainability issues through food system work.

2.4 Food Systems as a Place to Work on Sustainability

One of the key environmental issues of our time is moving towards planetary sustainability. Our food system is embedded in the problem and solution, thus offering great potential for innovation and sustainability solutions. This is particularly true at the community level, where environmental change and sustainability issues are increasingly being taken on by local and regional governments. Food is of so much interest to people because it is so personal and it is a way to act on their values, suggesting the opportunity to use food as a change vehicle.

This research is critical because it tackles planetary sustainability in a critical system and at the all-important important community level. In 2009, the Stockholm Resilience Centre proposed "planetary boundaries, for estimating a safe operating space for humanity with respect to the functioning of the Earth System" (Rockström, et al., 2009 (14(2): 32), p. 2). These boundaries are based on nine planetary systems including climate change, biogeochemical nitrogen, phosphorus; global freshwater use, land system change and loss of biodiversity (Rockström, et al., 2009 (14(2): 32), p. 1), each of which the current food system can be linked to through negative externalities that the system is currently producing.

While the current food system is arguably efficient and financially viable for some, it produces negative externalities for others including hunger, low farm income, negative

environmental impacts and health-related issues including obesity and other diseases, especially in youth. Furthermore, the system is based on a large-scale global industrial food and farming distribution model that is reliant on high inputs of fossil fuels and resources to be successful. Given planetary boundaries, the current food system will not be feasible for future generations. Finally, no one sector or nation or region can deal with the scale and complexity of these planetary problems we are all facing. While we need to be working at all levels across the critical systems of agri-food, energy and transportation, working at the local level in the food system has benefits. It is at this level where citizen engagement can be cultivated and mobilized. Transitioning to a food system that is local first, low carbon, resource efficient, healthy, clean and fair will help tackle planetary sustainability and it is a critical end goal of this research.

Michael Pollen explains his association to food and why he writes so much about it. "When [Wendell] Berry says, 'eating is an agricultural act,' that's a very empowering statement. He's saying you have political power in your everyday actions. When you decide what you're going to eat, what you're going to buy, you have real influence. That's why this idea has the potential to resonate with so many people. It's certainly one of the reasons it's resonated with me: I know I can act today. Three times." (Fassler, 2013).

"Food connects us all" (Campsie, 2008) was the title of a 2008 report commissioned by the Metcalf Foundation on the state of the sustainable food system in Southern Ontario. The Foundation brought food leaders together to set a course for working together on food system problems which resulted in this report and the creation of Sustain Ontario (Alliance for Better Food and Farming). As part of the group and as a founder of Sustain Ontario, it was easy to see the food connections amongst the group and specifically across those

working in food, farming, health, environment, policy and so much more. Eight years later, the Community Foundations of Canada released a report stating that food is the place where many of our most pressing issues meet (Community Foundations of Canada, 2016). Reconfirming that food system change is important because it can provide exponential change to improve more than just the food system.

Some would say that local food is at cross purposes to the mainstream agriculture system that has developed over the past sixty years. It is acknowledged that there are tensions and oppositions at work when using food and/or local food as a vehicle for working on sustainability solutions and community building. The Fraser Institute proposes that food "localism is associated with the rejection of global trade and agricultural technology, and is based upon a rather romanticized image of the 'family farm'. The acceptance of this 'ethic' reflects a degree of ignorance of (or a lack of appreciation for) the forces that have driven the development of modern farming and the expansion of global trade" (Katz, 2009, p. 24). In most food producing communities, big food companies and global trade are not the prominent face of agriculture. They are present through the farms and businesses they supply. It is a small sector of farmers, producers, service providers and food business owners who are recognized as the community members who 'feed' people. In all communities, there is a strong need to work together, respect each other and make room for all agriculture. In the global south, much of the sector that feeds the population is reflective of a small and local system that used to prevail in the global north. This project looks to find room in agriculture to re-create that local sector that is directly responsible for feeding people through short supply chains, local economic development and jobs, but not at the exclusion of the global food system. There is room for both food systems in most

communities, especially an increasingly sustainable global food system as part of a successful community food system.

As a final note, the report *Food Connects Us All* found "that there are many roads to change (George Cedric Metcalf Charitable Foundation, 2008, p. 5)." By applying this thinking to the large and complex Ontario food system they stated that change will come by pushing simultaneously and incrementally in a number of directions. Then, citing the 2007 book, *Getting to Maybe*, the result of pushing will be discovering "unexpected realignments and new synergies…The very complex forces of interconnection that make systems resistant to change are the same ones that can be harnessed to propel change (George Cedric Metcalf Charitable Foundation, 2008, p. 5)." This provides a good reminder that the food system is complex and there are many ways to change it that could yield surprising results.

2.5 Chapter in Review

This chapter has reviewed the development of the current food system to help facilitate an understanding of how sustainability issues have developed over time. It has defined and developed the concept of a food system and a community food system. Finally, it has underlined why community food systems are good places to start working on large scale global sustainability issues. The next section will build on this understanding while explaining the theoretical ideas around system thinking and transitions to sustainability.

Chapter Three: Theoretical and Conceptual Underpinnings of System Transition

3.1 Introduction

This chapter examines the theory and concepts supporting system thinking, complexity science, systems transition and the role of innovation and sustainability transition frameworks. The purpose of this section is to provide foundation knowledge and link these big ideas for the development of community food system transition tools.

3.2 Systems Thinking and Complexity Science

Understanding the foundations of systems thinking and complexity science is critical to this research as it is proposed that the problems in the food system are complex and as a result need a new process to help find solutions. Donella Meadows (Dana) is one of the highest regarded system thinkers and one of the 1972 *Limits to Growth* authors. She defines a system as "a set of things – people, cells, molecules, or whatever – interconnected in such a way that they produce their own pattern of behavior over time. The system may be buffeted, constricted, triggered, or driven by outside forces. But the system's response to these forces is characteristic of itself, and that response is seldom simple in the real world" (Meadows, Thinking in Systems, 2008, p. 2).

She continues to give implications of this idea summarized as follows: the structure of a market economy causes recessions and economic booms, not leaders; companies lose market share because of their policies, not competitors taking market share; oil-importing nations' policies that are vulnerable to supply interruptions cause oil prices to rise and oil-exporting nations are not solely responsible; we set up the conditions for the flu to flourish

within us, it is not that the flu virus attacks us; and, drug addiction is caused by a larger set of influences and societal issues, not by the failing of one individual. (Meadows, Thinking in Systems, 2008, p. 2)

In her book, *Thinking in Systems*, Dana Meadows simplifies systems thinking with the following prompting questions on systems.

> "How do you know if you are looking at a system or just a bunch of stuff:
> A) Can you identify parts?....and
> B) Do the parts affect each other?...and
> C) Do the parts together produce an effect that is different from the effect of each part on its own?...and perhaps
> D) Does the effect, the behaviour over time, persist in a variety of circumstances?" (Meadows, Thinking in Systems, 2008, p. 13)

She defined systems as "an interconnected set of elements that is coherently organized in a way that achieves something…a system must include three kinds of things: elements, interconnections, and a function or purpose" (Meadows, Thinking in Systems, 2008, p. 11). Finally, she said that, the elements of a system are typically obvious like those in a university that include buildings, students, professors, etc. and they can also include intangibles such as school pride and academic capabilities. They can be divided into sub-elements. However, the critical part is the interconnection of elements or the relationships between elements in conjunction with the functions and purposes of the system. (Meadows, Thinking in Systems, 2008, pp. 12-14) Finally, "A system is more than the sum of its parts. It may exhibit adaptive, dynamic, goal-seeking, self-preservation and sometimes evolutionary behavior." (Meadows, Thinking in Systems, 2008, p. 12)

At this point, it is also important to define the concept of a social-ecological system (SES). In their 1998 book, Berkes and Folke defined social-ecological systems in a way that is commonly referred to as follows: "Social-ecological systems are complex, integrated

systems in which humans are part of nature (Resilience Alliance, 2017)." Many others use similar definitions with the emphasis that humans must be seen as part of nature.

Complexity science builds on and uses systems thinking. It is useful to adopt a systems approach when implementing solutions to change a system. A simple way to understand complexity science is to first understand linear thinking and how the two differ. Linear thinking is cause-and-effect thinking or one cause has one effect. Using Newtonian scientific principles may explain a relatively simple mechanism such as a clock or describe the concept that the whole of the machine is the sum of its parts; however, it won't explain more complex entities such as humans or other living systems. Complexity science explains living systems in ways in which traditional approaches do not. It is not a single theory, but "the study of complex adaptive systems – the patterns of relationships within them, how they are sustained, how they self-organize and how outcomes emerge (Zimmerman, Lindberg, & Plsek, Edgeware: Lessons from Complexity Science for Heath Care Leaders, 2008, pp. 4-5)." Complexity science is a direct challenge to the dominance of the machine metaphor which has been used since Newton and it has served us well for manufacturing, medical and organization advances. "Complexity science with its focus on emergence, self-organization, interdependencies, unpredictability and non-linearity provides a useful alternative to the machine metaphor (Zimmerman, Lindberg, & Plsek, Edgeware: Lessons from Complexity Science for Heath Care Leaders, 2008, p. 13)."

Zimmerman had developed an easy way to understand the difference between simple, complicated and complex which she analogizes to baking a cake, sending a rocket to the moon and raising a child. Essentially, she says that we move from known to knowable to unknown as we move from simplicity to complexity as detailed in Figure 3 below.

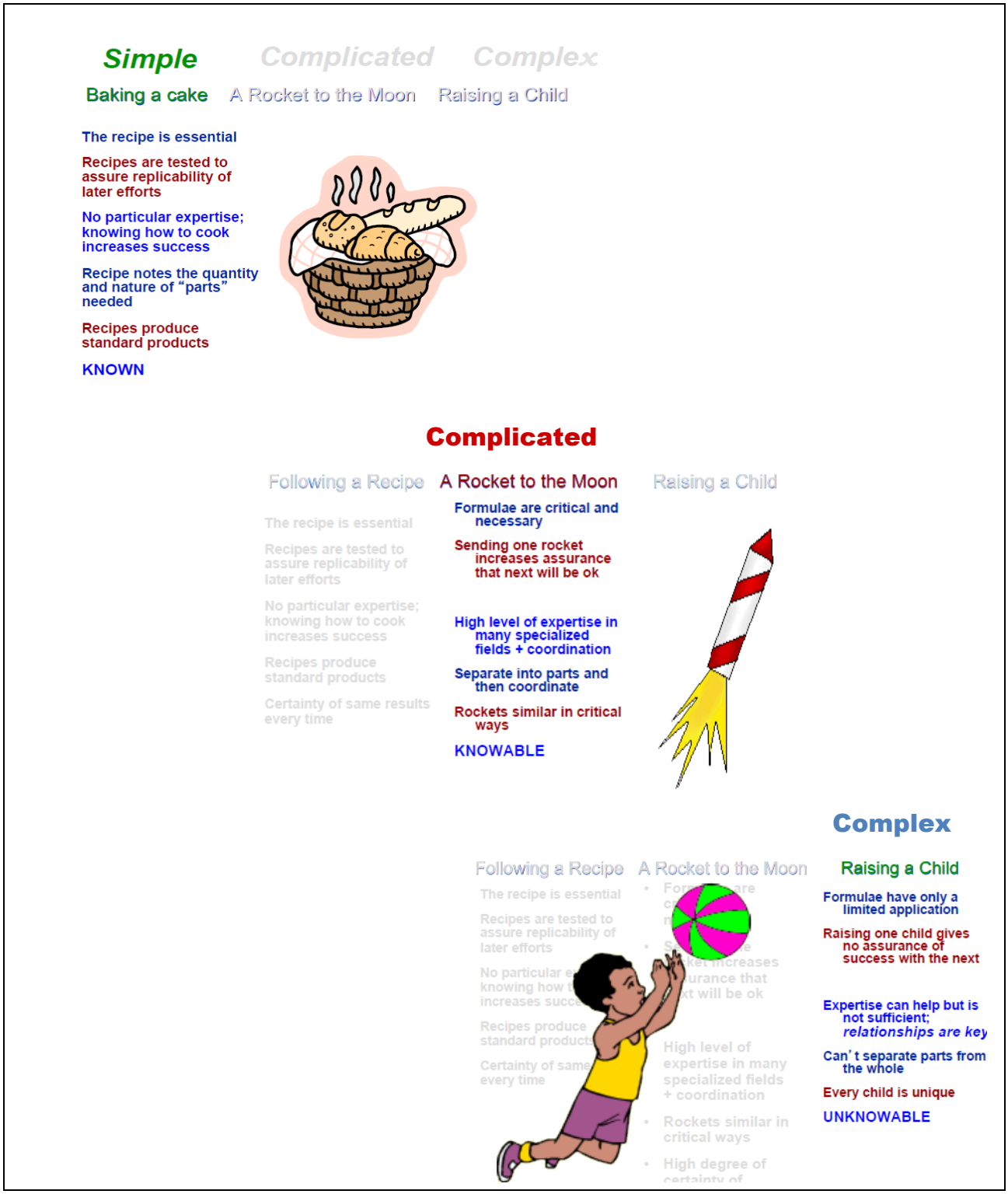


Figure 3 Simple, Complicated and Complex
(Zimmerman, So What does it Mean to Engage Complex Adaptive Systems, 2012, pp. 9-12)

This example highlights clearly the transition from a simple machine view of the world to a complex systems view. Zimmerman also defines the independent attributes of complexity as: adaptable elements; simple rules; embedded systems; co-evolution; non-linearity; not predictable in detail; order without central control; and, emergent outcomes. (Zimmerman, 2012, p. 18) For strategy making, she details the differences between simple/complicated and complexity in Table 1 as follows:

Simple/Complicated	Complexity
Plan, then act	Act-learn at the same time
Explicit plans	Both explicit plans and tacit knowledge
Strategy formulation followed by implementation	Strategy formation
Eliminate contradictions	Work with paradoxes
Look for agreement	Generative relationships
Limit type of action	Multiple actions
Specify paths/policies	Minimum specs and simple rules
Management by exception	Build on what grows

Figure 4 Strategies for Simple, Complicated and Complex Problems
(Zimmerman, So What does it Mean to Engage Complex Adaptive Systems, 2012, p. 33)

According to Thomas Homer-Dixon, in his book, *The Ingenuity Gap*, complex systems share the following six important features:

1. Composed of a *multiplicity* of things: they are made up of a large number of entities, components, or parts and complexity increases with the numbers
2. There is a dense web of casual *connections* among their components which results causal feedback (positive or negative). Sometimes the components are tightly coupled, which means a change in one component spurs rapid multiple effects on other components.
3. There is *interdependence* of the components, which means that if you divide a system into pieces, you can see how the change affects the properties and behaviours of the other pieces.
4. They have *openness* to their outside environments or they are not self-contained and it is often hard to locate a complex system's boundary.
5. They show a high degree of *synergy* amongst components or the whole is more than the sum of its parts.

6. They exhibit *nonlinear* behaviour meaning that a change in the system can produce an effect that is not proportional to its size. (Homer-Dixon, 2001, pp. 111-114)

Understanding how the food system has developed over the past two hundred years and especially the last sixty years with globalization, it is no surprise that many of the food system problems are complex. Often, we are trying to solve the problems with linear thinking and solutions.

The ideas of systems thinking, innovation and transition are reinforced by the field of social innovation which optimistically sets a course for recognizing the challenges but adopting the premise that we can get in and change the system. Social innovation in Canada draws heavily from complexity science, organizational and institutional change, resilience and transition and the field has been driven by the work of Frances Westley and her colleagues. This foundational work from social innovation will inform this project, especially as explained in the book *Getting to Maybe*:

"Complexity science embraces life as it is: unpredictable, emergent, evolving and adaptable – not the least bit machine-like. And though it implies that we cannot control the world the way we can control a machine, we are not powerless, either. Using insights about how the world is changed, we can become active participants in shaping those changes." (Westley, Quin Patton, & Zimmerman, Getting to Maybe How the World is Changing, 2007)

James J. Kay observed that one of the issues with sustainability is everything seems to happen at once and conventional science techniques don't help us answer the questions. System thinking provides not only a language, but conceptual tools for talking about the richness that comes with complexity. This is because system thinking is about the patterns of a relationship and how these relationships translate into emergent behaviours. (Kay,

2008, pp. 3-4) The next level of understanding is system dynamics and how systems transition.

3.3 System Transition Dynamics

System transition can occur in many different ways. As previously stated, systems include three kinds of things: elements, interconnections, and a function or purpose. Meadows looked at places to intervene in a system. Hollings and others looked how systems change (adaptive cycle) and the role of novelty and innovation as the source of change. He examined the adaptive capacity of systems including resilience or the ability of a system to adapt to change and still stay the same. Keystone species and their role in a system can be a factor in transition. Scale is a factor in system transition. Hollings cited innovation or novelty as the source of system change. System transition theories and concepts are being reviewed to understand not only the role that they play, but also how to turn this around and developing sustainability transition pathways for community food systems**.**

Places to Intervene in Systems

Many system scholars have theorized on how systems change and have proposed processes to manage system change. This includes looking at innovation as a change agent. "So, how do we change the structure of systems to produce more of what we want and less that which is undesirable" (Meadows, Thinking in Systems, 2008, p. 145)? This project derives its origins from Donella Meadow's ideas around places to intervene in complex dynamic systems supporting the notion that we can change systems through strategic leverage points. However, as Meadows cautions, often we have the right point, but we are

pushing in the wrong direction and end up with both the benefits and costs of a solution. Meadows delineated twelve points to intervene in a system ranging from the lowest impact (numbers – subsidies, taxes and standards) to the highest impact (transcending paradigms – unattached to specific mind-set of the system) (Meadows, Thinking in Systems, 2008, pp. 146-165).

In addition to general systems thinking, Meadows is best known for her work on understanding where to change systems or places to intervene in systems also known as leverage points. In order of importance, they are:

1. Transcending paradigms
2. Paradigms – The mind-set out of which the system – its goals, structures, rules, delays, parameters arise
3. Goals – The purpose or function of the system
4. Self-Organization – The power to add, change or evolve system structure
5. Rules – Incentives, punishments, constraints
6. Information Flows- The structure of who does and does not have access to information
7. Reinforcing Feedback Loops – The strength of the gain of driving loops
8. Balancing Feedback Loops – The strength of the feedbacks relative to the impacts they are trying to correct
9. Delays – The length of time relative to the rates of system changes
10. Stock-and-Flow-Structures – Physical systems and their nodes of intersection
11. Buffers – The sizes of stabilizing stocks relative to their flows
12. Numbers – Constants and parameters such as subsidies, taxes and standards (Meadows, Thinking in Systems, 2008)

The concept of using leverage points in system change analysis and implementation is well known, but difficult to find well applied. However, it holds great possibility for use in the food system change.

Adaptive Capacity, Adaptive Cycle and Panarchy

The study of system dynamics or how systems adapt and transition is a critical part of understanding how to influence transition in systems. Buzz Holling started to formulate

ideas around adaptive capacity of systems early in his career to understand specific parts of the ecosystem. With colleagues, he began to look at the capacity in terms of cycles over space and time with the result being first the adaptive cycle or eco-cycle and then panarchy. Both are fundamental concepts because they link together system organization, resilience and dynamics for SESs and they facilitate an understanding of complex systems from cells to ecosystem to societies.

The adaptive cycle (see Figure 4, below) models the four phases of an ecosystem or SES: growth or exploitation (r); conservation (K); collapse or release (omega); and, reorganization (alpha). In simple terms, the system transitions through a cycle that moves from **growth** (rapid colonization of a recently disturbed area) to **conservation** (slow accumulation and storage of energy and material or resources like a mature forest) to **release** (creative destruction of accumulated resources like a forest fire) to **reorganization** (restructuring of resources, including appearance of pioneer species). (Resiliance Alliance, 2017)

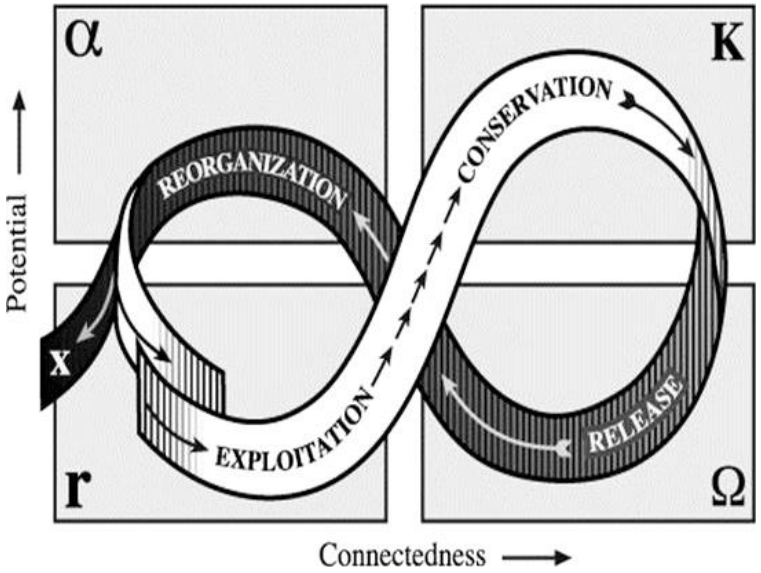


Figure 5 Adaptive Cycle
(Resiliance Alliance, 2017)

The cycle has two major phases or transitions which are referred to as the 'foreloop', or from r to K (slow incremental phase of growth and accumulation) and the 'backloop' or from Omega to Alpha (rapid phase of reorganization leading to renewal). It has long periods of aggregation and transformation of resources and then shorter periods that create opportunities for innovation. (Resiliance Alliance, 2017)

The term Panarchy (see Figures 5 and 6, below) is used when adaptive cycles are nested in a hierarchy across space and time. The nested hierarchy enables 'windows of experimentation' or 'novel re-combinations' to open and to be tested in other parts of the cycle. The stability of the nested hierarchies and the larger and slower components of the hierarchy provide the past memory and recovery of smaller and faster adaptive cycles. (Resiliance Alliance, 2017) The idea of complex systems at different scales and in nested sets can be understood by thinking about an ecosystem example of: a leaf in a tree in a forest in a region in a biosphere in periods from a day to a season to a geologic epoch. Thinking about a social system example across scale could be: a child in a family in a community in a city in a country over years, generations and centuries.

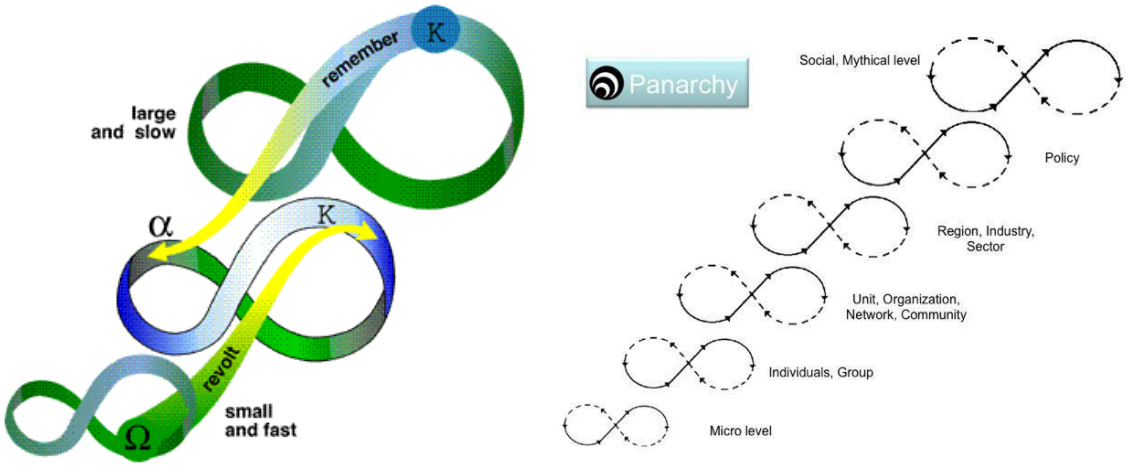


Figure 6 Panarchy
(Resilience Alliance, 2017) (Liberating Structures, 2013, p. 32)

No system can be fully understood with a focus on a single scale; that is, to understand the tree or the child, you need to understand the system or SES they exist and function in which will be over multiple scales of space, time and ecological or social organization. It is the interactions across scales that are also important in determining the system dynamics at any one scale. The panarchy framework helps rationalize change and persistence and the predictable and unpredictable, and the interplay between each. (Resilience Alliance, 2017)

The adaptive cycle and panarchy provide a framework to help understand complex adaptive systems that exist in SES. Specifically, the framework can be used to determine which phase a system is in in the adaptive cycle, what will come next and what the opportunities are for innovation and change. The panarchy framework can be used to site the system and determine potential influences from other systems which may be nested around. Using these frameworks encourages researchers to look deep into the system of inquiry and to examine other influences.

Resilience and Diversity

Resilience is often simply thought of as system's ability to withstand change while remaining the same. When applied to ecosystems or SES, resilience has three defining characteristics: "(1) the amount of change the system can undergo and still retain the same controls on function and structure; (2) the degree to which the system is capable of self-organization; and, (3) the ability to build and increase the capacity for learning and adaptation (Frances Westley, 2007)." Diversity is a critical factor in maintaining, building or reducing and losing and enhancing resilience. The Resilience Alliance states that "resilience of social-ecological systems depends largely on underlying, slowly changing

variables such as climate, land use, nutrient stocks, human values and policies". (Frances Westley, 2007) It would be a common society value to want to have resilient community food systems. To ensure resiliency each of the food system components there also needs to be a diversity of actors, production, product availability, access points, and waste recovery strategies to name a few.

Scale

Scale can be somewhat of an abstract and confusing concept at first glance, however understanding different meanings of scale and how they translate across system dynamics and sustainability transitions is important. Holling discussed scale as part of his ecological research and with others as part of panarchy. In panarchy at least six hierarchical levels were identified and each is dominated by one structuring process. Like other systems thinkers, he also defines scale in terms of macro, meso and micro levels. Sustainability transition researchers like Frank Geels talk about a multi-level perspective which includes landscape, regime and niche levels. This section will provide information on each of these scales.

As part of his ecological research as a pre-cursor to the panarchy framework, (see Figure 6, above) Holling describes the levels of scales as follows:

> "The smaller and faster scales are dominated by vegetative processes, the intermediate by disturbance and environmental processes, and the largest and slowest by geomorphological and evolutionary processes…The structuring processes establish a cycle of birth, growth and storage, and death and renewal as a nested set of such cycles, each with its own range of scales. For the microscales, fresh needles cycle yearly, the crown of foliage cycles with a decadal period, and trees or gaps cycle at close to a century or longer period… Those cycles are organized by four functions: exploitation, conservation, release, and reorganization." (Holling, 1992, pp. 449-450)."

Each of these scale ranges is defined by a broad range of processes which is summarized by levels as follows: "The microscales are dominated by vegetative processes, the mesoscales by disturbance and environmental processes, and the macroscales by geomorphological and evolutionary processes (Holling, 1992, p. 480)."

This hierarchical structure and scale organizes the time behaviour into cycles which are nested as in panarchy.

Another way to consider scale is by the structures of social institutions (legal, political, cultural and economic) on the three levels:

- Macro is the cultural, economic and governance institutions that embody the macro scale rules that frame the behaviour of organizations (government, private firms to civil society) and this level currently will not likely support innovation for sustainability.
- Meso or the problem domain level (organizations and communities) is where there are opportunities to incorporate novelty and innovation.
- Micro or the individual and small group level is where the invention originates and where early sources of support for the disruptive or catalytic innovation may be found. (Westley, et al., 2011)

Sustainability transition researchers discuss scale based on a multi-level perspective (MLP) which "understands transitions as outcomes of alignments between developments at multiple levels. The typology is based on variations of *timing* and *nature* of multi-level interactions… including: niche-innovations, sociotechnical regimes and sociotechnical landscape (Geels & Schot, 2007)." The three interrelated levels are:

- Landscapes provide the environment in which regimes evolve and they consist of features like geographical position of land, climate and available resources and political constellations, economic cycles and broad societal trends. As landscapes shift, so do the possibilities for innovation and scaling up innovations
- Regimes are the dominant rule sets supported by incumbent social networks and organizations and embedded in dominant artifacts and prevailing infrastructures of particular industries or social problem arenas.
- Niches are where radical innovations originate. They are small protected spaces in which new practice can develop, protected from harsh selection criteria and resistance from prevailing regimes. (Westley, et al., 2011)

Finally, while scale is used to understand complex adaptive systems and SESs, scale is also about building capacity for the innovation at different levels which can lead to transition.

Keystone Species

The keystone species concept is examined because of its foundations in ecology, its more recent use in culture and its potential to act as a driver of change in SES and community food systems. It was first named by Paine in 1969 as "a very specific ecosystem process: down regulation of species diversity, competitive interactions, and community persistence (Davic, 2003, p. 1)." Much of the original research was based on food-web examples in marine environments and it has remained a somewhat controversial concept in definition and use. Holling in 1992 proposed an extended keystone hypothesis: "All ecosystems are controlled and organized by a small number of key plant, animal, and abiotic processes that structure the landscape at different scales (Holling, 1992, p. 478)," A proposed 2003 refinement presents a definition within the context of functional groups: "a keystone species is a strongly interacting species whose top-down effect on species diversity and competition is large relative to its biomass dominance within a functional group (Davic, 2003, p. 7)." Going back to the original definition by Paine, he recognized that keystone species played a key role in local species diversity by preventing monopolization of one species. With the add-on of Davic in 2003, this can be taken to mean the keystone species works in its own functional group.

The most noted and potentially controversial example of a keystone species happened in recent years in Yellowstone Park. The loss of a species in an ecosystem due to local loss or extinction has become common; however, biologists had the opposite

experience when the wolves, a keystone species, were re-introduced into Yellowstone Park. They have caused a 'trophic cascade of ecological change'; change that has helped to increase beaver populations and bring back aspen, and vegetation. (Yellowstone Park, 2011)

The original keystone concept has been refined and extended by anthropologists to identify cultural keystones which are defined, like ecological and literal keystones according to their structural role within social systems. They are defined as system elements with crucial non-redundant functions to maintain any particular level of structural complexity. (Platten & Henfrey, 2009, p. 493) A cultural keystone is regarded as complex, even if based around a single species. Its contribution to system structure relies on other factors including other biological species, artifacts, knowledge, and social practices. It also depends on subjective factors including beliefs, ideas, norms and values concerning social identity and its enactment through culturally appropriate practices. (Platten & Henfrey, 2009, p. 498)

There are many examples of cultural keystones in food systems of developing countries. Two examples are bitter cassava consumption amongst lowland South American groups and commercial cultivation of carrots in Rurukan Village in Minahasa, Indonesia. Both examples are centered on a single biological species, but the cultural keystone is a complex surrounding them that includes the beliefs, ideas, norms and values concerning social identity and its practice. This plant species has become economically important through social engineering. One of the first published examples of culture keystones highlights the ecological and cultural importance of ironwood trees in the Sonoran Desert of Southwestern North America. Ironwood is a keystone species ecologically and it is also a

cornerstone to the craft based economies of Seri Indian and Mexican communities of Sonora, Mexico. (Platten & Henfrey, 2009, pp. 491-493)

This research study asserts that the keystone species concept is important in both ecological and cultural domains and for application to food system change where a good community food idea could drive change in a value chain and potentially the entire food system. In a community food system example, a functional group could be a value chain like cider beverages that could also drive change across economic (new value chain for apples through to agri-tourism), environmental (sustainable local apple production) and social (apples provide healthy food supply, edible education opportunities and community building).

3.4 Role of Innovation

This project assumes novelty and innovation are a key factor in system change and transition. Innovation also ties together many of the ideas around the adaptive cycle and resilience. It is an idea which is embedded in systems thinking, complexity science and in the work of Buzz Holling (the 'father of resilience thinking') and his ideas around adaptive cycles. "We believe that the generation of novelty, and hence adaptive capacity, is critical for maintaining resilience in complex systems under stress (Allen & Holling, 2010, p. 2)." This important concept will be foundational for this research when detailed as follows:

> "Novelty and innovation are required for systems to remain dynamic and functioning. Without innovation and novelty, systems become overconnected and dynamically locked, so the capital thein is unavailable. Novelty and innovation are required to keep existing complex systems resilient and to create new structures and dynamics following system crashes. This is true in all complex systems, and the importance of novelty is recognized as much in the management and business world as it is in the scientific one – more so, perhaps." (Allen & Holling, 2008, p. 225)

Allen and Holling also examine how novelty and innovation are generated, the types found in complex adaptive systems and how it performs across scale to increase resilience. They contend that novelty is generated at all levels and it is required for systems to function and remain dynamic. Without innovation and novelty, systems may become over connected, dynamically locked and the system capital may not be available. They propose novelty or innovation is organized into three types: background, incremental and punctuated. Background novelty is generated as a result of the normal dynamics of complex systems. Incremental novelty is added over time during the adaptive cycle in the form of new connections, functions and arrangements of elements. Punctuated novelty is added or introduced when the resilience of a complex system is exceeded and it collapses. During the reorganization novelty may be added at a local or global level. To summarize, novelty originates routinely from variability present in cross scale structures, within scale reorganization during adaptive cycles and in whole-scale transformations from regime shifts. (Allen & Holling, 2010, pp. , 7, 8 and 9) This project will utilize these foundational concepts for understanding novelty and innovation in community food systems.

In addition, according to social innovation expert Frances Westley, innovation happens through emergence, bricolage and improvisation. Emergence can just appear in human organizations and in nature. In human organizations, while there may be a deliberate strategy in place, an unrealized or emergent strategy may come up and become part of the realized strategy. From the previous adaptive cycle discussion, innovation can also emerge from system conditions.

Bricolage is simply combining "old elements in new ways (Westley, Presentation - Using a Design Lens to Explore, 2012)." In organization theory, improvisation is a way "to

understand the processes of creativity and innovation and prevent being handicapped by order and control (Weick, 1998)."Bricolage "involves the creative adaptation and manipulation of resources such as human capital, materials, financial resources and social capital to solve a problem or embrace a new opportunity...The key element of bricolage is that these resources are 'existing' or 'available'." (Gundry, Kickul, Griffiths, & Bacq, 2011) The term "bricolage" dates to the French origin of the word meaning tinker. The pattern of behavior of "creation of something new through a process in which actors recombine and transform existing resources" was first identified by Levi-Strauss in 1967. (Gundry, Kickul, Griffiths, & Bacq, 2011)

Improvisation can be examined in two ways: "as a noun an improvisation is a transformation of some original model; and, as a verb, improvisation is composing in real time that begins with embellishments". Improvisation is affected by one's associates, past experiences and current setting, it is also determined by the kernel that provides the pretext for assembling these elements in the first place…The same holds true for organizational "melodies" such as mission statements… (Weick, 1998)."

3.5 Modelling Complex Systems to Integrate Ecological, Economic and Social Theory

In the concluding chapter of the book *Panarchy*, the authors aim to work towards an integrative synthesis of theory and practice by combining the big ideas from ecological, economic and social theory with regional sustainability. "Seeking sustainable futures is based on linking grounded theory with thoughtful practice (Yorque, et al., 2002, p. 419)." They have developed the triangular model in Figures 6, 7, and 8, below which links the theories with the practice. The theories are grounded in ecology, evolution, economics and

free markets, and social and institutional dynamics; whereas the practice is grounded in resource conservation, business development and community empowerment. (Yorque, et al., 2002, p. 420) The authors of *Panarchy* agree that it is necessary to integrate theory and practice to solve sustainability problems through a more inclusive approach and to accelerating learning through actively adaptive networking. "…We suggest that learning our way into sustainability can best be done by a two-step process: (1) build on the theoretical understanding presented in this volume [Panarchy], and (2) test and apply the theories in a series of regional case studies (Yorque, et al., 2002, pp. 433-434)."

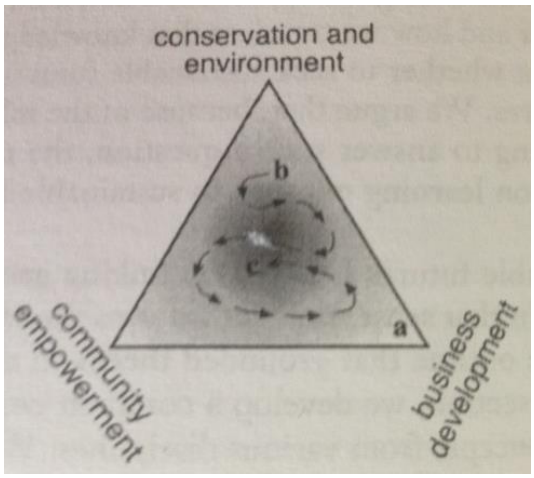


Figure 7 Tripartite Objectives of Practice
(Yorque, et al., 2002, p. 420)

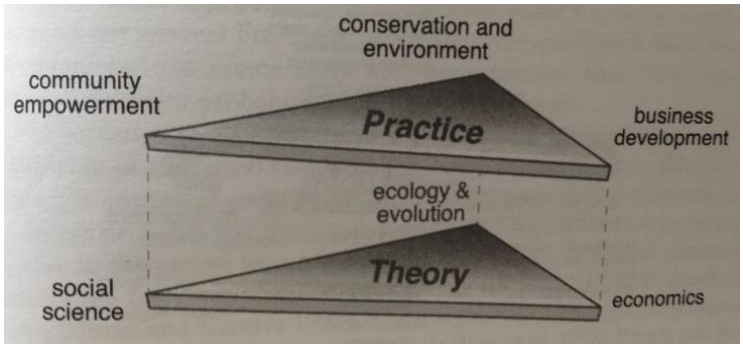


Figure 8 Triangle of Theory and Regional Sustainability
(Yorque, et al., 2002, p. 421)

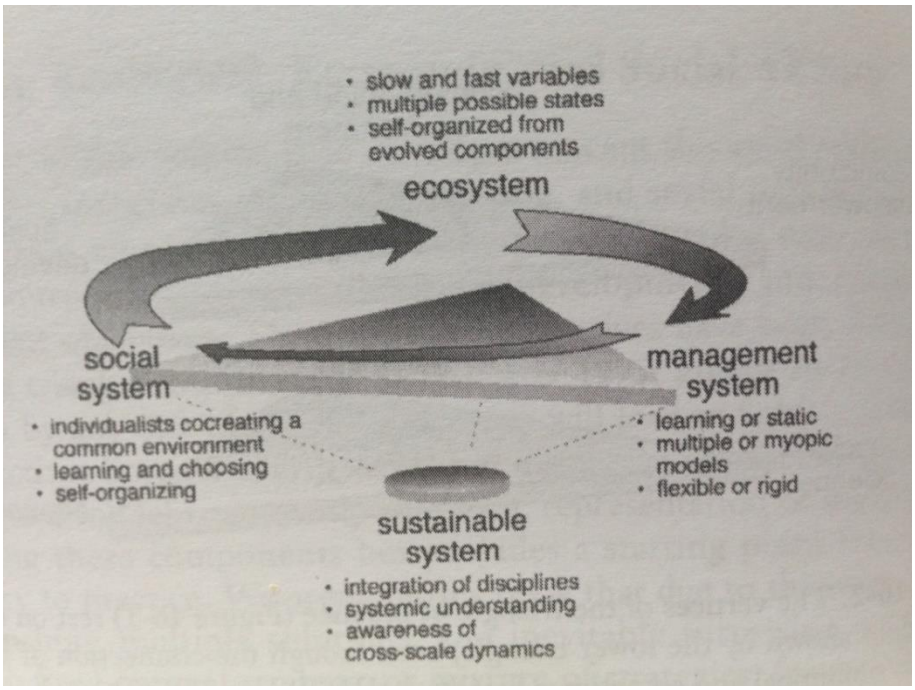


Figure 9 General Structure of the Simulation Models of People and Nature (Yorque, et al., 2002, p. 422)

3.6 Sustainability Transition Frameworks

Complimentary to the ideas of system analysis and leverage points, is the work on sustainability transitions that uses and incorporates the ideas in the preceding sections. Sustainability transitions provide a framework and historical case studies to help understand how transition to sustainability can be processed, implemented and achieved. In this section three different transition frameworks will be examined. Each brings a different understanding to the research. The 1995 Efficiency Substitution Redesign (ESR) framework by Hill and MacRae approached the transition from a functional systems perspective. The 2007 Multi-Level Perspective (MLP) by Geels & Schot framework is based on system intervention at one of three scales and the transition pathways from the interactions of the scales. The 2017 Framework Innovation for Transformative Change

(Deep Transition) is led by Johan Schot and it focuses on reframing innovation from a mainly business driven focus to a social-ecological system focus.

ESR Framework

The ESR framework was developed over ten years and released in 1995. (See Figure 9 below) It is focused on transitioning agriculture from conventional to sustainable. It is ideally used on farms and in institutions, but it could also be used for health and energy applications. The conceptual framework sets out three stages of transition: efficiency; substitution; and, redesign. The original purpose was for analyzing and implementing the transition process. (Hill & MacRae, 1995, p. 82).

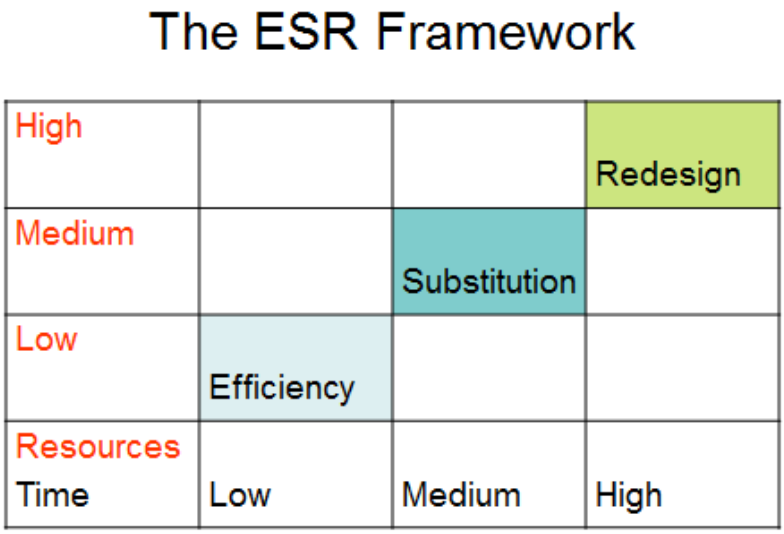


Figure 10 The ESR Framework
(MacRae, What could be Research?, 2013, p. 8)

The framework plots resources and time for each stage of the transition with each higher level requiring more time and resources to be devoted to transition. Table 2, below lists a conceptual frame for each stage both on farm and in institutions.

Farm		
Efficiency	**Substitution**	**Redesign**
Reducing consumption and waste of resources	Replacing disruptive products and procedures	Using internal design and management approaches to recognize and prevent problems
Institutions (Applies to all levels of government, research and education organizations and agribusiness. Analytical framework to be applied to process of decision making and to the contents of the designs)		
Efficiency	**Substitution**	**Redesign**
Minor changes to programs, operations and regulations for sustainable agriculture	Replacement of product, technique or activity with one of similar structure but different intent	Recognizes and incorporates the existence of natural, ecological and psychosocial laws to develop internal systems to recognize indicators that warn of an approaching threshold

Figure 11 Key Points of ESR Transition Framework for Farms and Institutions
(Hill & MacRae, 1995, pp. 82, 85-86)

In addition, the framework details an on-farm and institution label for each stage which is useful to create a visual picture and provide a simple description of the stage. The following examples of each level from conventional to redesign are given for farms:

- **Conventional:** Factory Farm
- **Efficiency:** Low-Input and Resource Eco-Agriculture
- **Substitution:** Eco-Agriculture
- **Redesign:** Permaculture, Natural and Ecological Farming (Hill & MacRae, 1995, p. 83)

The following are examples of each level in institutions:

- **Efficiency:** modify existing programs to be more client and sustainable agriculture focused (e.g. do not penalize organic farmers for not using synthetic fertilizers).
- **Substitution:** introduce sustainable agriculture policies, research or products into current structures and activities.
- **Redesign:** adopt sustainable agriculture goals as the goals for the food system and then design programs, products and research to meet those goals. (Hill & MacRae, 1995, p. 85)

This framework could easily be used with all components of a community food system and it would be an extremely useful tool to help define and guide the transition process.

MLP Framework

The MLP framework was developed by Geels and Schot in the Netherlands in the early 2000's. (See Figure 10, below) This early work spawned the Sustainability Transitions Research Network (STRN) as a transition specialist group with an annual conference and a journal (Environmental Innovation and Societal Transitions). In addition, over the years there have been many active researchers who have tested out this framework and developed historical cases studies on the MLP. In addition, Geels and Schot have continued to modify and adapt the original concept.

The MLP recognizes that sustainability problems are a formidable societal challenge at a magnitude much greater than the hygiene and infectious disease problems in the nineteenth century. The transitions involve new technologies in addition to changes in markets, user practices, policy, culture and institutional governance. The MLP has a broader focus that previous one which focused on market technology or behavioural change as solutions. Taking a systems-thinking approach, the MLP looks at dynamic interactions and co-evolution between elements. It focuses on multiple actors and social groups, not only firms, consumers or markets. The most appropriate analytical level for the MLP is communities or organizational fields. (Geels F. W., 2008, pp. 523-524).

Geels proposes that new environmental problems like climate change, biodiversity and resource depletion will require substantive 'socio-technical' transitions in energy, transport and agri-food systems. "Socio-technical transitions to sustainability do not come about easily, because existing energy, transport, housing and agri-food systems are stabilized by lock-in mechanisms that relate to sunk investments, behavioural patterns, vested interests, infrastructure, favourable subsidies and regulations" (Geels F. W.,

Ontologies, Socio-Technical Transitions (to sustainability), and the Multi-Level Perspective, 2010, p. 459). He further proposes that a multi-level perspective can be used as a framework for understanding sustainability transitions that will be used in this project. "The MLP distinguishes three analytical levels: niches (the locus for radical innovations), socio-technical regimes, which are locked in and stabilized on several dimensions, and an exogenous socio-technical landscape" (Geels F. W., Ontologies, Socio-Technical Transitions (to sustainability), and the Multi-Level Perspective, 2010, p. 495).

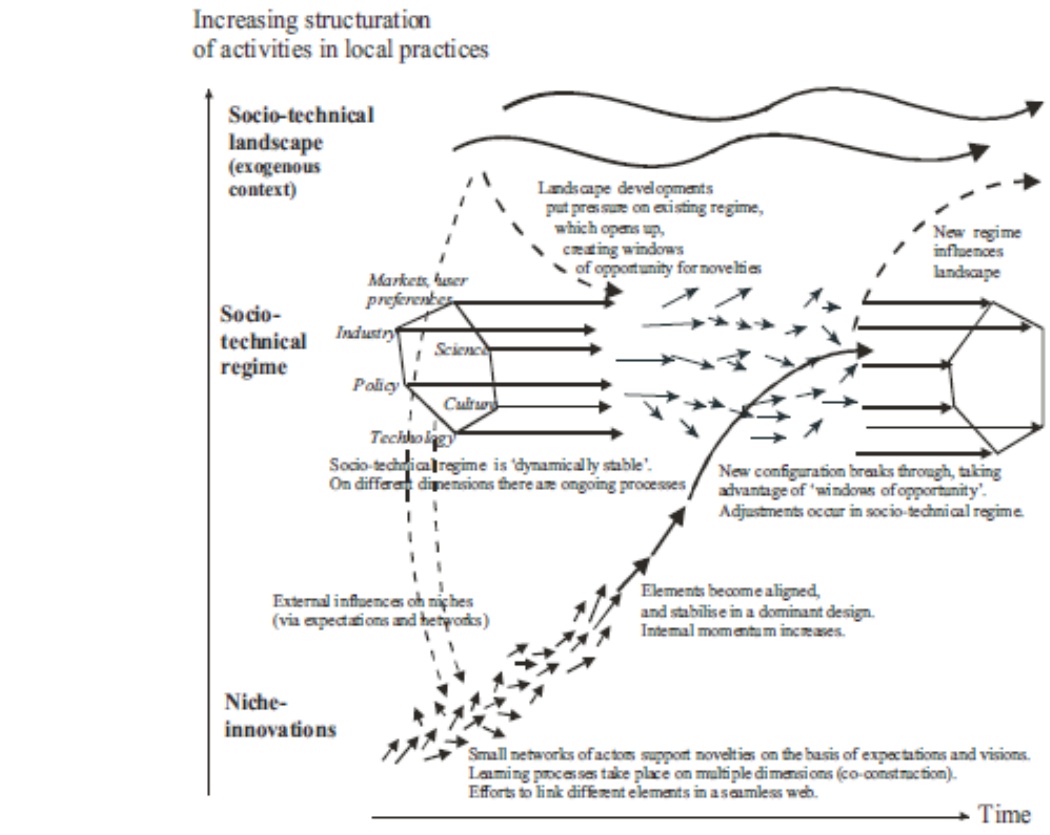


Fig. 2. Multi-level perspective on transitions.

Adapted from Geels (2002:1263).

Figure 12 Multi-Level Perspective Framework (Geels & Kemp, The Multi-Level Perspective as a New Perspective for Studying Socio-Technical Transitions, 2012)

Transformative Innovation Policy

The third framework is from the Transformative Innovation Policy Consortium (TIPC) led by Johan Schot out of the SPRU - Science Policy Research Unit at the University of Sussex. He was one of the Dutch researchers who originally developed the MLP with Frank Geels. The consortium includes the following six research partners: University of Sussex (UK), The Research Council of Norway, The South-African National Research Foundation, Colombian Administrative Department of Science, Technology & Innovation (Colciencias), Swedish Governmental Agency for Innovation Systems (VINNOVA), Finnish Funding Agency for Innovation (Tekes). The TIPC's mandate is to deliver a new policy innovation framework to help solve grand challenges. These challenges are also called wicked problems due to their complexity and that fact that they are hard to solve. They have multiple causes, no one answer and there are no templates on how to tackle them. And, they are often interconnected. It is also expected this frame will also affect policies for a sustainable bio-economy. (Bloomfield, 2017)

According to background reports prepared by TIPC, it is timely to rethink innovation policy as researchers, governments and international organization worldwide want innovation to address current grand challenges. How to design, implement and govern challenge-led policies is not clear. In the European Union, these challenges are being taken seriously as can be seen by the growth and support for Responsible Research and Innovation (RRI). (Chataway, Daniels, Kanger, Schot, & Steinmueller, 2017, p. 2)

This new framing of transformative change is based on how to use science and technology policy at a fundamental level to meet social needs, address issues of

sustainability and inclusiveness. One of the drivers of this policy is the UN Sustainable Development Goals published in 2015. This work builds on fifty years of innovation policy resulting in the following three analytical frames.

- **Frame One *R&D & Regulation*:** It dominated from 1960s to 1980s. It was about growth through stimulating knowledge production (research and development) and high tech solutions through incentives. The innovating actors are experts, scientists and engineers. The logic model is based on a linear *invention – innovation – diffusion* model. The market steers the diffusion and government intervention is with market failure.

- **Frame Two *The National Systems of Innovation*:** It began in the 1990s and is dominant today. The frame doesn't identify system failures such as a lack of cooperation and coordination between various actors in the innovation system. A broader range of actors are involved such as universities, networks, users, governments, and market actors (small medium sized companies and entrepreneurs). The linear model is replaced by a more interactive and complex model with feedback loops. Policy activities built on previous efforts and expand to include interactive platforms and education efforts for entrepreneurship. Any innovation that fosters economic growth and competition is encouraged.

- **Frame Three *Transformative Change:*** It is currently in emergence. This frame is shaped by the need to solve social and environmental challenges and deal with human welfare. R & D and innovation do not always do this, so the overall goal is to influence socio-technical regimes so they can lead to transformation in structures and institutions. The innovation actors can be anybody including companies, governments and civil society. Broad societal participation is highlighted. Policy interventions work to open up processes to generate a diversity of solutions and set up experiments. (Bloomfield, 2017)

Innovation policy for transformative change aims to broaden the concept of innovation beyond its traditional focus and it should support constant 'tinkering' to re-make socio-technical systems as well as developing new services and organizational models to meet the grand challenges. It should involve a wide range of actors and choices. It should allow for deep learning, greater diversity of options and challenging the dominant

views. Finally, Frames 1 and 2 were mainly developed in the US and Europe and assume that developing countries need to 'catch-up' using science, technology and innovation policy. Frame 3 does not assume that system change will come from the Global North and other countries need to 'catch-up'. It assumes that both the Global North and the Global South must contribute to transformative change and learn from each other. Finally, it assumes diverse pathways are possible and local generation and adaptation is encouraged within the process of system transformation. (Schot & Steinmueller, 2016, pp. 20-21)

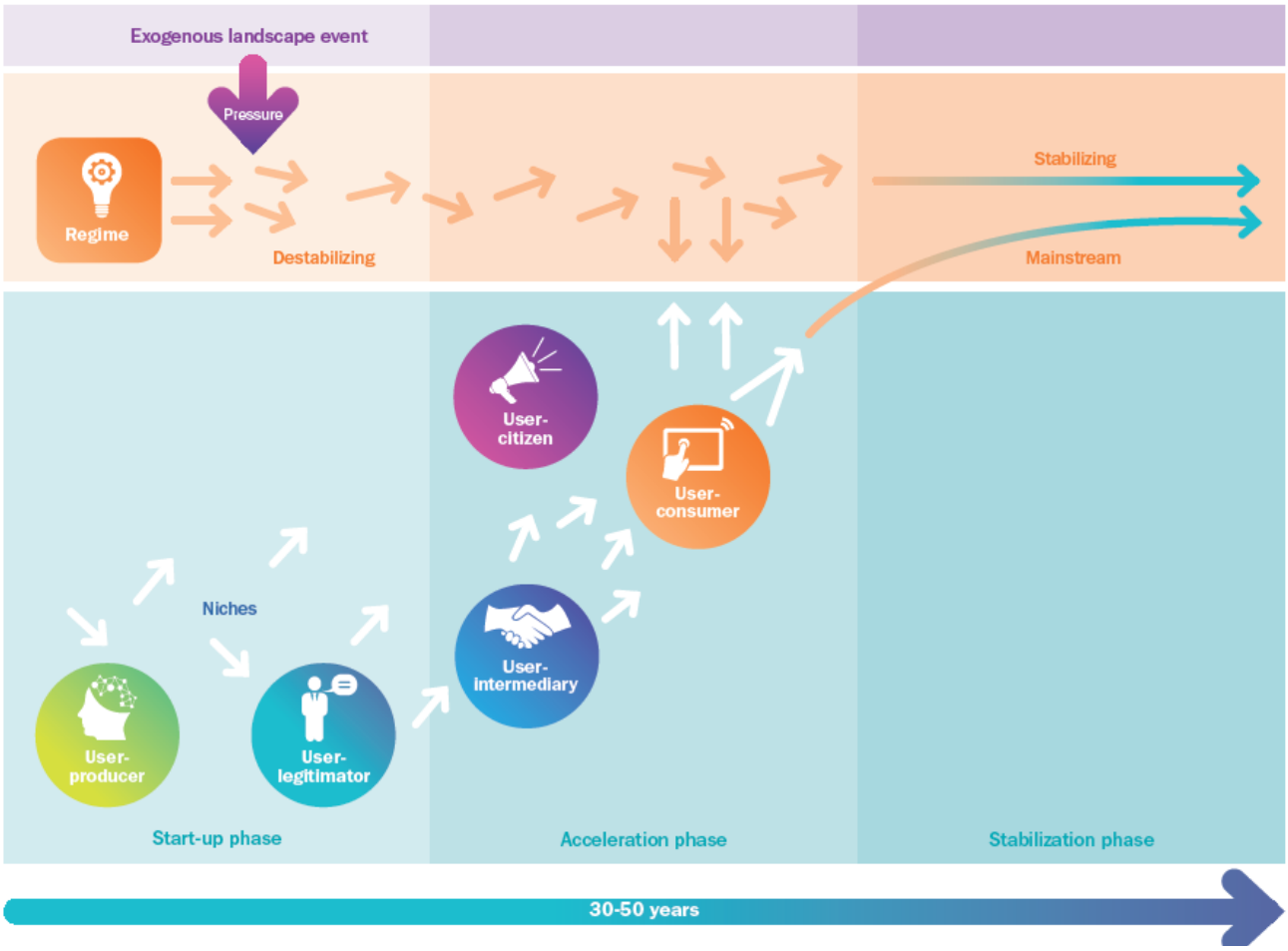


Figure 13 From Niche to Mainstream, Why People Power is the Key to Changing Our System
(SPRU, University of Sussex, 2016, p. 8)

As a footnote to designing innovation policy, people power or citizen engagement in the process is now purposefully add in and given a key role in the transition process. (See Figure 11, above) This is an important addition to moving from developing policies to how the innovations play out in the system.

3.7 Chapter in Review

This chapter has reviewed the theory and concepts that have been identified as important when taking a systems approach to community food system change and transition to sustainability. Systems thinking and complexity highlight the importance of understanding what drives systems and how to makes changes (places to work and places to intervene in systems). Adaptive capacity, adaptive cycle and panarchy highlight the importance of understanding how systems work and adapt at different levels and scales. This combines with the ideas of sustainability transition frameworks and working at multiple different levels and intensities to adapt the system towards sustainability. Keystone species will drive and adapt the social-ecological system across multiple areas. Innovation brings diversity and resilience to a system and it is critical to keeping the system adaptive.

Chapter Four: Lessons from the Field

4.1 Introduction

Food system work has increased at what seems like an exponential rate in communities across Ontario, Canada and in other parts of the world over the last twenty years and has accelerated in recent years. From Food Policy Councils to Food Charters and Food Strategies to the Sustainable Cities Initiative in the UK, communities are getting involved in food and farming issues. At the same time, innovation hubs for high tech business and now social issues are emerging. Community builders are developing asset based projects to kick start developing solutions to big complex problems. Each of these examples has a lesson for food system transition.

This chapter examines lessons from the field to ground theory and concepts in real life examples of transition. A varied and strategic mix of examples has been chosen to demonstrate examples of relevant transitions from both inside and outside the food system. The purpose of this section is to provide insight and inspiration on transition challenges and opportunities and tie those back to the theoretical lessons in the previous chapter. All to aid in the development of community food system transition tools.

4.2 Canadian Municipal Food Policy Entrepreneurs

A 2013 cross-Canada survey found "64 local and regional municipalities are working to improve the food system, using a mix of municipal policies, programs and civil-society interventions…they are trying to shift the dynamics amongst food system actors to improve environmental sustainability, health promotion, and economic development" (MacRae & Donahue, Municipal food policy entrepreneurs: a preliminary analysis of how

Canadian cities and regional districts are involved in food system change, 2013, p. 2). The report, titled *Municipal Food Policy Entrepreneurs*, made three recommendations from the survey and scan including: a network needs to be created to share information and best practices and build capacity for the work; initiatives need to document and evaluate work to demonstrate successful processes; and, policy makers at various government levels need to define linkages between municipal, provincial and federal policy domains (MacRae & Donahue, Municipal food policy entrepreneurs: a preliminary analysis of how Canadian cities and regional districts are involved in food system change, 2013, p. 3). To gain insight from the work of these municipalities, four examples (Toronto, Thunder Bay, Calgary and Prince Edward County) have been chosen to examine the food system work they are doing.

Toronto

The City of Toronto has been active in food issues since the establishment of the Toronto Food Policy Council (TFPC) in 1991. With not many other municipal food players in Canada, the city continued on with the Toronto Food Charter in 2000 and the launch of the Toronto Food Strategy in 2008. Internationally, Toronto has signed on to the Milan Urban Food Policy Pact and is participating in the C40 Food System Network. It is supported by Canada's commitment to working towards the UN Sustainable Development Goals include ending poverty, inequality and injustice and tackling climate change. According to the City, a systems approach to supporting and championing a healthy, sustainable food system for all is used by the Toronto Food Strategy and its partners. The TFPC is an implementation partner for the strategy to help with specific projects and it uses research, facilitation and partnership building to incubate and act on these projects. The six key objectives of the strategy are: healthy food access; community building and

inclusion; food literacy; community economic engagement; infrastructure and supply chain; and, improving the food environment. Toronto is described as a city well-placed to lead the way in developing a healthy, sustainable, affordable and equitable food system because it has a robust economy, high levels of industrial innovation and a diverse network of academics, entrepreneurs and social enterprises. (City of Toronto, 2016)

The Food Strategy builds upon the work already undertaken by Toronto Public Health (TPH) and other city divisions and takes an "action research" approach to develop and prototype projects that concentrate on addressing complex, interconnected elements of the food system, preventing chronic disease and promoting good health.

Toronto is an urban city of approximately 2.8 million people embedded in an even larger surrounding urban area known as the Greater Toronto Area and the Greater Golden Horseshoe. Toronto's food system experience provides a number of lessons including: this work was started over 25 years ago and it has built slowly and steadily; the work is supported municipally and administered by Toronto Public Health (TPH); TPH has afforded protection from budget cuts and has enabled an evolving group of "institutional entrepreneurs" to work within the system to move food issues forward; and, action is pushed by the TFPC, a citizen-led group and formally a sub-committee of the Board of Health.

Thunder Bay

The City of Thunder Bay has developed and endorsed the following municipal food system actions: Food Charter in 2008, Food Strategy in 2014 and Food Strategy Implementation Plan in 2016. The group transitioned to Thunder Bay and Area Food Council in 2016. The Food Strategy focuses on the following seven areas: Food Access;

Forest and Freshwater Foods; Food Infrastructure; Food Procurement; Food Production; School Food Environments; and, Urban Agriculture. The work has been managed by EcoSuperior an incorporated non-profit focusing on environmental work. In April 2013, the group received a three year Ontario Trillium Foundation grant to hire a full-time coordinator which followed two Greenbelt grants. (Thunder Bay and Area Food Strategy, 2017)

Thunder Bay is a mid-sized northern Ontario city with a population of approximately 110,000. The Thunder Bay food experience provides interesting lessons for food system work including: the timeline for charter-to-implementation plan is approximately ten years; the food work is administered outside the municipality by a non-profit; the group relied on outside foundation grants to fund the work including hiring staff, while seeking endorsement and participation from local governments; and, the community has been able to rally a group of producers, food businesses, academics, civil society organizations and governments to seriously engage in food system change.

Calgary

The City of Calgary formed a Food Policy Council in in 2008 and started a food assessment and action plan process in 2009. Building on the community efforts, *Calgary Eats! A Food Assessment and Action Plan* was released in 2012. The plan was endorsed and published by the City of Calgary and authored by The Calgary Food Committee and Serecon Management Consulting Inc. (supported by the Altus Group). Funding was provided by the Calgary Foundation, the Mayor's Innovation Fund and several city departments. The Calgary Food Committee is made up of a multi-sector stakeholder group with representatives from each element of Calgary's food system. The vision is to create a

sustainable and resilient food system for the Calgary region so that every Calgarian has access to local, healthy and environmentally friendly food. The core principles of the plan include: local, accessible, secure supply, environmentally sustainable, healthy and community development. The principles were based on the imagineCALGARY food targets developed in 2005 during the creation of Calgary's Long Range Urban Sustainability Plan when over 18,000 citizens and specialists were engaged. (City of Calgary, 2012) (Calgary Eats! Calgary Food Assessment and Action Plan, 2012)

In 2014 a required follow-up report to Council was prepared and in January 2016 a position was created in the Office of Sustainability to move the food system work forward. The city began a stakeholder engagement process in 2016 on how to increase food production, processing and distribution through current by-laws. The proposed changes go to Council September 2017 and include: a new *food production* use with aquaponics and aquaculture; flexibility for new *breweries, wineries and distilleries*; *intensive agriculture* definition and clarification. In the future they want to investigate land owners growing food on their properties, pop up sales on city property, change landscaping requirements in place of food growing, take greenhouses out of height restrictions and letting homeowners use their garages for food production. (City of Calgary, 2017)

Prince Edward County

The 'County' has a long tradition of agriculture. A lot of the food system work appears to have been driven more by the business community. Forming a Hastings Prince Edward food policy council was recommended by a May 2017 report from the Poverty Reduction Strategy group. (Poverty Round Table, 2017) It is interesting to note that the

county studied and adopted a cultural strategic plan in 2005 and from that plan experienced incredible economic development success. In addition, it should be noted that all of the original work including some on-the-ground work was completed early on by the now Director of Ontario Culinary Tourism Association. In addition, the economic development department is the Community & Economic Development. Figure 12, below list the results of an investment in a 2005 cultural strategic plan.

PRINCE EDWARD COUNTY, ON: Agri-ECONOMIC DEVELOPMENT

Prince Edward County, Ontario, with a population of 25,000 adopted a cultural strategic plan in 2005 to address economic decline. This focussed on wineries, local foods, restaurants and tourism attractions. The results:

1. $50million wine industry investment
2. 300% increase in building permits ($16million - $70million)
3. 168% increase in tourism (now a $100million industry)
4. $30million in downtown revitalization
5. $750million increase in assessment
6. Population decline has reversed and is now up 2%

Figure 14 Results from Prince Edward County's 2005 Cultural Strategic Plan (City of Calgary, 2012, p. 61)

4.3 Food Projects

This section examines a mix of three other food projects that provide valuable lessons on community food system transition. Early on in this project two promising European farm and agriculture research projects (FarmPath and Food4Sustainability) were examined to provide a different perspective on transitions in food and agriculture. Both these projects helped inform the early stages of inquiry but conclusions won't be reported on due to the narrower focus on farming for Farm Path and the lack of reporting of Food4Sustainability from 2014 on.

City Region Food Systems

The International Sustainability Unit has delved into the role of city region food systems in resilience and sustainable development. Specifically, they examine city region food systems and the concept of developing a Food 3.0 which sets the following aspirational goal for this research:

> "The city region food system concept requires a paradigm shift in thinking that recognizes the powerful and democratic role of city regions in creating the 'Future We Want'. If the world seems to be moving further towards a Food System 2.0 scenario, with both the benefits and drawbacks that this brings, the city region food systems approach might represent a step towards creating 'Food System 3.0': where food is recognized as a multifunctional nexus bringing together landscapes and human wellbeing, where enterprise flourishes, and where linkages become critical tools for delivering beneficial outcomes." (Jennings, Cottee, Curtis, & Miller, 2015, p. 37)

The study concluded ten actions for city region food systems which have been summarized in Table 3, below. These actions have been fundamental to understanding how municipalities can develop a transition process.

Ten Actions for City Region Food Systems	
Catalyzing change	**Recognizing the ability to act** based on the link between food systems and public goods
	Convening stakeholders to build wide coalitions of interest
Understanding the food system	**Understanding local food systems** through local context and developing metrics and making data available
Using policy instruments	**City region policy** should be broadly supported for City regions around food in land use and policy frameworks
	Infrastructure and support for everything from roads to information
	Procurement for local products through public value chains and incentives for local
	Enabling Policy for national governments, international institutions and donor organizations and reducing barriers

Leveraging wider impact	**Enterprise and innovation** to create incentives and support for linking consumers to products including social and technical innovations for new and existing enterprises
	Financing through development agencies, governments and the investment and philanthropic communities and consider financing mechanisms like that can municipal bonds and social investment vehicles.
Learning and sharing knowledge	**Spreading best practice** all actors should record and evaluate initiative outcomes and NGOs, national institutions and universities can share from local to international levels

Figure 15 Actions for City Region Food Systems
(Jennings, Cottee, Curtis, & Miller, 2015, pp. 70-71)

Ontario Tender Fruit Design Lab

A practical example of food system intervention was completed from 2013-2015 for the Ontario Tender Fruit Growers as part of a Social Innovation Lab through MaRS Solutions Lab and the Waterloo Institute for Social Innovation and Resilience. The *Ontario Tender Fruit Lab* used a design thinking process to analyze how to build a resilient tender fruit industry through an innovation agenda and interventions for resilience. An action plan was created across five areas to boost the industry economically, socially and environmentally. (Buré, Laban, & van den Steenhoven, 2015) This approach was an example of going into the tender fruit sub-system and determining the issues through a structured process. The process provided valuable information for understanding how to do design based assessment that is applicable to and relevant for this research on municipal food systems.

Vermont Farm to Plate

The Vermont Farm to Plate project began in 2009 with policy initiated by the Vermont Legislature. They tasked the Vermont Sustainable Jobs Fund with conducting a public engagement process to analyze the state's food system and created the 10-year Farm to Plate Strategic Plan (2011-2020). The plan developed seven food system components (see Figure 13, below). The components are slightly different than those typically used for a community level and they are reflective of the additional legislative and financial powers a state or provincial level government has. The work is managed by the Vermont Sustainable Jobs Fund. It is a non-profit organization that serves as a backbone organization to coordinate the 350 member network through a collective impact model to achieve the Farm to Plate goals. (Vermont Sustainable Jobs Fund, 2017)

Figure 16 Vermont's Food System Components (Vermont Sustainable Jobs Fund, 2017)

The overarching goals of the food system plan is to increase economic development and jobs in the food and farm section and improve access to healthy local food for all Vermonters. The Farm to Plate Network developed 25 Farm to Plate goals with activities and initiatives around those goals for Vermont (see Figure 14, below). The goals are widely inclusive and comprehensive including everything from consumption to energy to state regulations. The goals and strategies express where the state is going to get to by 2020. To achieve these goals, the group has developed a sophisticated, closely monitored data measurement system for the goals and indicators.

Figure 17 Vermont Farm to Plate's Goals (Vermont Sustainable Jobs Fund, 2017)

The state has a population of approximately 624,000 and it is smaller than some of the cities reviewed in the previous sections. (Vermont Sustainable Jobs Fund, 2017) Nonetheless, as a state level government, it has greater powers than local levels do around a number of issues for change levers around policy and funding. This in combination with the group's process around goals and measurement and adoption of a collective impact model serves as a great example for community level initiatives.

4.4 Innovation Projects

This section details three innovation projects that have lessons for embedding innovation into community food systems.

The Innovators of the Digital Age

Walter Isaacson has written extensively about innovators (Einstein, Benjamin Franklin, Kissinger, Steve Jobs and upcoming Leonardo da Vinci). He writes about the innovators who created the digital sector (computer and internet) in his 2014 book *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution.* From his research he has some innovation lessons that are applicable to any sector including the food. Specifically, he writes,

> "…creativity is a collaborative process. Innovation comes from teams more often that from the lightbulb moments of lone geniuses. This is true of every era of creative ferment. The Scientific Revolution, the Enlightenment, and the Industrial Revolution all had their institutions for collaborative work and their networks for sharing ideas. But to an even greater extent, this has been true of the digital age. As brilliant as the many inventors of the Internet and computer were, they achieved most of their advances through teamwork." (Isaacson, 2014, p. 479)

He notes that the most productive teams are those who have the widest array of specialties. He recommends pairing visionaries who can generate ideas with operating managers who can execute them. He notes that visionaries, who lack a great team, are often not successful. (Isaacson, 2014, pp. 480 - 481) According to Isaacson, there were three ways that collaborative teams were put together in the digital age:

- government funding and coordination (original computers in 1950s under President Eisenhower with the philosophy that the government should undertake projects for the common good like the space program and interstate highway system and often in partnership with universities and private contractors as part of a government-academic-industrial triangle);

- private enterprise (research centres of big companies like Bell Labs, Xerox PARC, Texas Instruments, Intel, Atari, Google, Microsoft and Apple with the key driver being profit as a reward for players and a way to attract investors); and,

- throughout history collaborative creativity has been organized through peers sharing ideas and making contributions as part of a voluntary common endeavor or as Harvard scholar, Yochai Benkler has labelled 'commons-based peer production' which internet enable on a larger scale than previously (building of Wikipedia and Web, Linux and other open-source software) because the open architecture is easy for others to build on top of and finally, this type of production is driven by reward and satisfaction, not financial rewards. (Isaacson, 2014, pp. 482-483)

Isaacson summarized by explaining that the most successful digital endeavors were run by leaders who not only fostered collaboration, but also provided a clear vision. (Isaacson, 2014, p. 484)

Finally, he makes the point that critical to innovation is not only respecting science and the humanities together, but where they intersect. This is best demonstrated by Steve Jobs who stressed this at all of his product launches and in particular his final one for the iPad 2. He stated, "It's in Apple's DNA that technology alone is not enough – that it's technology married with liberal arts, married with the humanities, that yields us the results that makes our heart sing." That's what made him the most creative technology innovator of our era (Isaacson, 2014, p. 487)."

The lessons for incorporating innovation into community food system transition are as follows: build collaborative teams and a collaborative process; use government funding and coordination mixed with private sector players and open source or community engagement; develop a clear vision; don't forget to include implementers; and, find the place where technology, liberal arts and humanities meet as the place of innovation.

Carleton Connect Initiative

Carleton Connect Initiative (CCI) is Australia's leading 'innovation precinct' that is anchored by the University of Melbourne. Innovation precincts are environments where interaction between sectors, disciplines and geographic boundaries are encouraged and people work together in creative and entrepreneurial ways. CCI started five years ago in the site of a former hospital adjacent to the University campus and it is still evolving. They have created 'LAB-14' which is a mini innovation hub prototype and the first stage includes

multinationals, start-ups, government research labs, a PhD college, artist studio, university offices, a gallery and exhibition space all in one space. They consider it a thriving ecosystem that is driven by research themes of energy, water, climate change, sustainability and city resilience. There is a connection with German Universities for a PhD program. (University of Melbourne, 2017) (Shaw, 2017)

University alumni teams have created companies who fundraised over $10 million in investment to create 250 jobs and generate $10 million in revenue. Innovation teams from the Australian Post mix with a design-led thinking team from IBM's Bluemix Innovation garage and they engage with other tenants including hackathons, research symposia, events, research projects and student internships. Australia Post also supports The Melbourne Accelerator Program (MAP) that is student led. (University of Melbourne, 2017) (Shaw, 2017)

CCI uses an ecosystem-based approach to innovation to address global challenges by driving partnerships across disciplines and sectors. By working with research, industry, government, entrepreneurs and the social sector, they are breaking down barriers between disciplines, sectors and geographies. They actively drive collaboration through diverse activities. They invite the community to participate to help solution complex problems. (University of Melbourne, 2017) (Shaw, 2017)

There are many lessons for community food system transition from the CCI. The first is that they have created a dedicated intentional space to make this work happen. The second is setting up an innovation ecosystem with a cross-sectoral approach to break down barriers between and within sectors (business, government, research and civil society

organizations), disciplines (science and humanities), and geography. Finally, they welcome citizen engagement as critical to the process.

Transformative Social Innovation

TRANsformative Social Innovation Theory (TRANSIT) is an EU project running from 2014 to 2017 to develop a theory change process in social relations that involves new ways of doing, organizing, framing and/or knowing. It is looking at changes in dominant institutions and structures. The project is theoretical but also uses case studies and engagement with social entrepreneurs and innovators, policy makers and academics to inform theory. (TRANsformative Social Innovation Theory (TRANSIT), 2014) The TRANSIT theory, using a multi-level approach is detailed in Figure15 below. They have developed a new approach by including the concept of system innovation and three game changers (economic crisis, climate change and ICT revolution) that drive change.

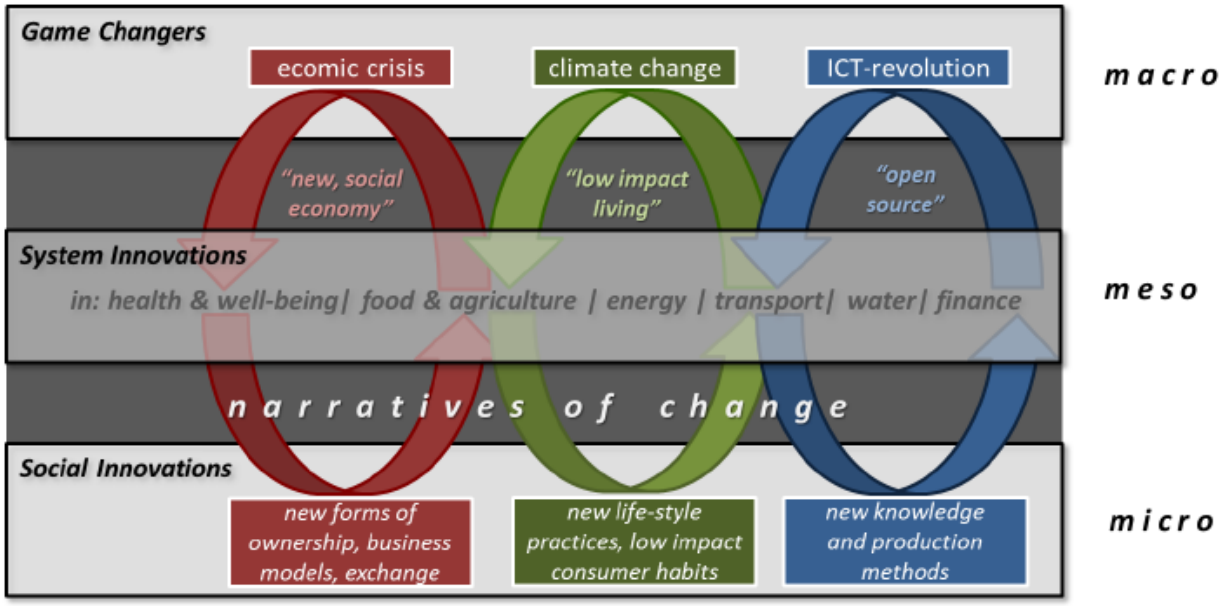


Figure 18 Transformative Social Innovation Theory Model (Avelino & Wittmayer, 2014, p. 7)

These game changers can be used as a catalyst for food and agriculture sustainability transitions. Climate change recognition and mitigation has been slow because it has a negative effect for the economy and it is potentially disruptive for society. In contrast, the ICT revolution represents a positive for the economy and it has caused established business practices to change at a fast rate for a number of years now, however government regulation is still slow. Understanding these game changers and incorporating them into transition pathways will be important to community food systems.

4.5 Community Building

Community building is a critical tool as part of community food system transition at all stages from initial engagement to ensuring stakeholders have a vested interest in what is being built. This section looks at the following three approaches to community development: Asset-Based Community Development; Incredible Edibles; and, collective impact.

ABCD Community Development

ABCD Institute and the ABCD process originated with work initiated in the 1980's by John McKnight and Jody Kretzmann around civic engagement at Northwestern University. It has developed into a worldwide movement that considers local assets as the primary building blocks of sustainable community development. "Building on the skills of local residents, the power of local associations, and the supportive functions of local institutions, asset-based community development draws upon existing community strengths to build stronger, more sustainable communities for the future (ABCD Institute, 2017)**."** The centre currently works out of De Paul University in Chicago. It is currently involved with: building

community capacity; helps communities conduct research; developing the next generation of civic and community building leaders; and, producing publications and resources. (ABCD Institute, 2017)

At the heart of its work is helping communities that are in trouble and want to rebuild in the face of complex social and economic problems. With limited outside help, creative leaders in communities are realizing that that they have to turn to neighbours, local citizen organizations and their community institutions. ABCD provides the process and resources to do this work. The work involves identifying assets through a number of different tools like asset mapping and building social capital amongst members to build on what is already the community's best assets. (ABCD Institute, 2017)

Incredible Edibles

Incredible Edibles is a voluntary food project that has exploded in the UK and internationally with the founder Pam Warhurst's TED talk. It builds on the concept of three plates (community, learning and business) to make a place strong and resilient. It is based on achieving four positive outcomes; community connections, community leadership, local learning and business intelligence. The genius of the project is community engagement and using the connection to food and place to engage people. It is a grassroots project that is a do-it-yourself gardening anywhere concept and it has been successful without staff or formal organization. This is a premier example of community engagement and building. (Schifferes, 2014)

Collective Impact

Collect impact is about a way organizations can work together on complex problems. The Tamarack Institute defines it as follows:

> "Collective impact is an advanced form of collaboration which brings together different sectors for a common agenda to solve large complex problems. Complex systems change requires leadership from various partners: government leaders, funding agencies, schools, hospitals, the private sector, the not-for-profit sector, community organizers and more. This is where collective impact comes into play – as a method to engage partners from different sectors to solve the complex social problems of the day." (Tamarack Institute, 2017)

Collective impact is built on five interconnected components: common agenda; shared measurement; mutually reinforcing activities; continuous communication; and, backbone support. (Tamarack Institute, 2017) Many collaborative groups are adopting this model to deal with complex problems that are beyond any one of the organizations involved. The Vermont Farm to Plate project uses a collective impact model. Again this is a good way to work on community food system transition projects as they are complex and cross many tradition simple problem boundaries.

4.6 Chapter in Review

This chapter highlights a number of lessons for community food system transition. From the municipal entrepreneurs, it is evident that food system change is a process that takes time. The projects like Vermont that have used a collective impact approach with a diversity of participants and a strong measurement system have a better likelihood of succeeding. With the innovation, collaboration and recognizing the intersection between technology and humanities is critical for success. The game changers also need to be

considered at the local level as they have broad and potentially deep influence on all parts of the food system. From community development, it is apparent that recognizing assets and what is going right with a community is important to building and transitioning that community. Further, the role and abilities of community volunteers is often underrated and it is a critical asset that should be used. Finally, collective impact is a good process for working with a group of stakeholders on a complex problem.

Chapter Five: Fostering Community Food System Transition to Sustainability

5.1 Introduction

This chapter of the report brings together theory and concepts with practice. To guide communities through transition to sustainability, a transition process and transition tools have been developed for communities to dig deeper into system change. In true innovation form, the tools have been developed in a bricolage fashion; that is, in most cases the tools are not brand new, but they have roots in other areas or they have been re-packaged or re-designed for use in community food systems. In addition, the entire process and tools have been brought together as a community food plan process to help communities transition their food systems.

This overarching ten step community food plan process that includes the following six transition tools: using a ten step **Community Food Plan Process** to guide transition; defining and agreeing on **Food System Components** for shared understanding of the system; completing a **Community Food Assessment and Asset Mapping** to increase knowledge and understanding of baseline; developing **Design Principles** to guide transition; adopting an **Innovation Ecosystem** approach to foster a cross-sectoral community innovation culture; and, determine and use unique **Community Good Food Ideas** to help drive change.

Three of the tools (community food assessments, asset mapping and design principles) are not new tools, but they are used in new ways for community food plans. While the concept of building an 'ecosystem' is starting to be used in community projects

and in business environments, for this project it is used in a systems thinking way as opposed to in a linear fashion. Framing innovation ecosystems for food projects provides a new transition tool. An innovation ecosystem is about creating a mindset and physical space for innovation, as well as a formal recognition. In this application, the process uses six key areas and the relationships between the areas to help drive ideal conditions for food system innovation. Finally, using unique community food ideas to drive and focus change as a socio-ecological system keystone is a new idea based on the cultural keystone concept. Transition pathways will be different for each community and they map out their road to success. Finally, Community Food Plans provide a process for transitioning the food system to sustainability through development of a formal transition process with tools to aid communities.

5.2 Bringing Forward Theoretical, Conceptual and Field Lessons

Theoretical, conceptual and field lessons were explored in this research project to provide guidance on developing transition tools and a transition process through community food plans. The following lessons have been harvested from earlier sections and used in this section to report on the development of the community food plan transition process and pathway to sustainability. The theoretical and conceptual lessons and their translation to transition tools and pathways are included in the following sections.

Systems thinking and complexity lessons highlight the importance of understanding what drives systems and how to makes changes (places to work and places to intervene in systems). Using a well-defined system model to define the system and sub-

system components is critical to this project. This also translates into using design principles to guide the system work at a high level and using an innovation ecosystem approach to introduce novelty and diversity into the system.

Adaptive capacity, adaptive cycle and panarchy lessons highlight the importance of understanding how systems work and adapt at different levels and scales. This combines with the ideas of **sustainability transition frameworks** and working at multiple different levels and intensities to adapt the system towards sustainability. The innovation ecosystem helps to guide understanding and cultivating relationships between the system components.

Keystone species have been translated and used as Community Good Food Ideas that will drive and adapt the social-ecological system across multiple areas. It is hoped these ideas will cascade and promote growth across the entire system. For example, increasing fruit and vegetable farms will build the local direct-to-market value chain for not only residents, but also for school programs, institution purchasers and food businesses. It would be expected to increase the culinary and agri-tourism operations as well.

The role of **innovation** has informed development of the innovation ecosystem to nurture and accelerate innovation across social, environmental and economic areas. The ecosystem approach encourages development of an innovation culture and a dedicated space and role for innovation.

Community building and asset based development will be embedded in the transition process by accounting for and using the community's assets (natural, built and financial, human and social) to help move the food system to sustainability. This also provides an important reminder of using community engagement and **collective impact** as

drivers of system change. The Incredible Edibles provides an example of what a community and its members can do without any formal intervention of government, business or CSOs.

The theoretical, conceptual and field lessons have played an important role in forcing a broader examination of food system change. It is hoped this will open up new possibilities for communities doing food system work and challenge them to work deeper into the system and community for change and transition to sustainability.

5.3 Community Food Plans: A Transition Process and Pathway to Sustainability

This section discusses the transition tools that have been developed for this project to be used in community food systems that are transitioning to sustainability. A simple visual conceptual diagram has been prepared (see Figure 16, below) to give a snapshot overview of the transition process. A total of six transition tools have been developed for different parts of the process including the following:

- A detailed ten step community plan process has been developed to provide communities a transition pathway to sustainability (see Figure 17, below);
- Food System Components (see Figure 2);
- Community Food Assessment (see Part II);
- Design Principles (see Figure 18 below and Part II);
- Innovation Ecosystem (see Figures 19 and 20 in Part I below and Part II); and,
- Community Good Food Ideas (see Figure 21 below).

Each of these tools gives simple directions on how to complete the step. The ten step process, design tools, innovation ecosystems and community good food ideas have been detailed below. As mentioned, the following figure gives a visual snapshot of the overall transition pathway.

Figure 19 Transition Pathway to Sustainable Community Food System

Community Food Plans: A Ten Step Transition Process and Pathway to Sustainability

This new community development transition tool (see Figure 17, below) provides communities with a process to build on previous work and to deepen their food system transition work. This provides a guideline or a framework that will need to be altered for each unique community application based on the community assets and previous work including other policy initiatives and programs like Food Charters and Food Strategies. In the spirit of development evaluation, it should also be an iterative process that responds to new opportunities and/or challenges.

Community Food Plans: A Ten Step Transition Process and Pathway to Sustainability

1. **Cross-Sectoral Group:** Establish cross sectoral and citizen group to represent food system stakeholders to be called the Food Committee. Should include representation across food and farm system from business, government, civil society organizations and citizens. Establish a core management groups for the process to develop the community food plan.

2. **Preliminary Food System Model, Vision and Goals**: Group should agree on a preliminary food system model (including components), vision and goals. It is crucial that the food system components be mapped out and delineated as a key first step (see Figure 2 as an example of a food system from Calgary). As the process moves along these will also build into design principles and data points for system goals and vision. This phase should be informed by background information on what other local communities have done and other community food system models.

3. **Food Assessment, Asset Mapping and Policy Review:** A food system assessment, asset mapping and a policy review need to be completed.
    a) Assessment should include: vision and approach, including methodology; food system profile; food system component review by each individual component including a baseline state and SWOT for each; measurement and gap analysis; and, roles for action.
    b) Asset mapping to map out the community system.
    c) A policy review to provide a snapshot of the roles and regulatory bodies in the community food system across federal, provincial and municipal levels and in the municipal role in the food system by department.
    d) This phase may require funding and an outside consultant to complete the work in conjunction with the food committee.

4. **Innovation Ecosystem:** Create an innovation ecosystem to support, nurture and incubate new food businesses community food agencies and organizations. The ecosystem will create the environment that supports and welcomes innovation across the sector. It will involve developing programs and physical spaces dedicated to innovating in the food and farm sector. The ecosystem's core components will include:
    a) Collaboration: Driving Change Together for Collective Impact
    b) Social Innovation: Cultivating Social Innovation and Breaking Down Institutional Barriers (Rules, Values and Lifestyles)
    c) Policy: Developing Food and Farm Friendly Policy
    d) Economics/Business: Building the Business Engine by Calculating the Dollars and Sense
    e) Technology: Supporting Sustainable Technological Innovation Including Embedding Agroecology and Biodiversity to Build Resilience and Value Nature
    f) Measurement: Measuring Success and Impact

5. **Collective Impact Model:** The food committee to commit to adopting a collective impact model to move forward the community food system work. The group will also need to agree on: a common agenda; shared measurement system; mutually reinforcing activities; continuous communication; and, backbone support. This will involve having one organization or government body managing the work of the group as a backbone organization.

Community Food Plans: A Ten Step Transition Process and Pathway to Sustainability (Continued)

6. **Community Engagement:** The food committee will need to embed community engagement as part of the process at different times so that ownership of the work is shared across the community.

7. **Design Principles:** With the results of the assessment, the committee will need to establish design principles to guide the work at a high level. Most system participants should be able to adopt the principles and translate them to their individual work at an appropriate level.

8. **Community Good Food Ideas:** With the results of the assessment, the committee will need to formulate community good food ideas to provide a place to start working and build on existing work already being done in community or new work that will fill an identified gap.

9. **Coordinating Resources and Timeline:** This process will likely require a full time dedicated coordinator that will resource the food committee and ensure the work keeps moving. It is expected that this transition process will take from 24 to 36 months to develop and begin implementation of the community food transition plan. It is expected that communities will develop policy tools that could change existing by-laws and build on existing food charters and strategies. It is expected that strategies, infrastructure (hard and soft) and other community development plans will be initiated. It is expected that the process will inspire the community to develop and build on these plans so that the sky is the limit and the possibilities are endless.

10. **Transition to Sustainability:** Transition requires considering the **intensity** of the sustainability efforts: staying the same or becoming more efficient or substituting more sustainable innovations/components or redesigning the entire food system. Transition also requires consideration of what **level** the transition will happen at: individual; organization/business; community; province; country; global; or in niche, the main SES (regime) or at the level of institutions and society's rules (landscape).

Figure 20 Community Food Plans: A Ten Step Transition Process and Pathway to Sustainability

Design Principles or Effective Principles to Guide Food System Change

Dealing with complex problems like sustainability and food system transition means that simple best practices are not enough to guide change. Best practices are more effective for simple problems. Develop and adopting effective principles can be a logical way to provide guidance for cross-sectoral stakeholders working on the problem; principles which they can hold and agree on. Principles can be interpreted and adapted to the context of each community food system and its challenges and opportunities. (Patton, 2011, p. 167)

The food system principles broadly address sustainability goals by focusing on improving social, environmental and economic outcomes. They address community well-being and resilience by focusing on the foundations of a healthy community defined by the following six pillars: healthy people; dynamic economy; sustainable environment; vibrant culture; engaged citizens; and community assets. (Headwaters Communities in Action, 2016, p. 3) These principles can become the pillars of the food system with indicators and data points to ensure progress is measureable. Typically they are high level so that all stakeholders can agree on them and translate them to their own mandate. See Figure 18, below for an example of principles. It is expect that each community would develop a set of principles that reflect their unique geography, circumstance, cultural composition, existing food system work (Charter, etc.) and current food system assets. These principles would then be agreed upon by local food system stakeholders.

Community Food System Transition Tools: Proposed Effective Principles to Guide Transition

- Ensure all residents have access to healthy, affordable food options;
- Minimize environmental impact of food production and transport;
- Facilitate and encourage local food production and processing;
- Create local jobs that provide fair working conditions and a living wage;
- Benefit local economies by supporting local food producers, retailers and businesses;
- Maximize food resources for human consumption and minimize waste through re-distribution and reuse (compost)
- Educate all residents, business and government on food literacy
- Connect and engage citizens and cross-sectoral groups to build community
- Build local infrastructure and community capital

Note: These principles have been guided by the Sustainable Cities Institute who state a version of some of these principles as key issues. **Invalid source specified.**

Figure 21 Effective Principles to Guide Transition

Innovation Ecosystem

Innovation ecosystems can be developed to help ensure all participants and sectors embrace and nurture innovation to make it part of their regular everyday work. Innovation is traditionally a tool business uses; however to make food system change, innovation needs to be wide spread and a core premise of transition. Individuals, government, businesses and/or organizations should all be innovating and adopting an innovation

ecosystem approach will help embed innovation across these sectors. Further, the ecosystem approach enables commitment to innovation at different scales, different sectors, and different business or organization models. The ecosystem includes the following six key components: collaboration, social, policy, business/economics, technology and measurement. Each component can help bring all the food system actors together to work separately and jointly on transition through innovation and building an innovation ecosystem. These components have developed from the original innovation framework approach used in the project. An ecosystem approach is more inclusive and wide-spread. It invites not only business, but government, organizations and individuals to embrace each component. It promotes sustainability across social, environmental and economic pillars. It promotes system thinking and solutions for complex problems. When fully built out, the ecosystem would include actions and opportunities to adopt this approach at different scales and across the entire community food system. As with other components of this transition plan, this approach helps the community to finds ways to work together when needed and work separately when needed. The ecosystem approach encourages community building through transition. See Figures 19 and 20 below for design concept for innovation ecosystems.

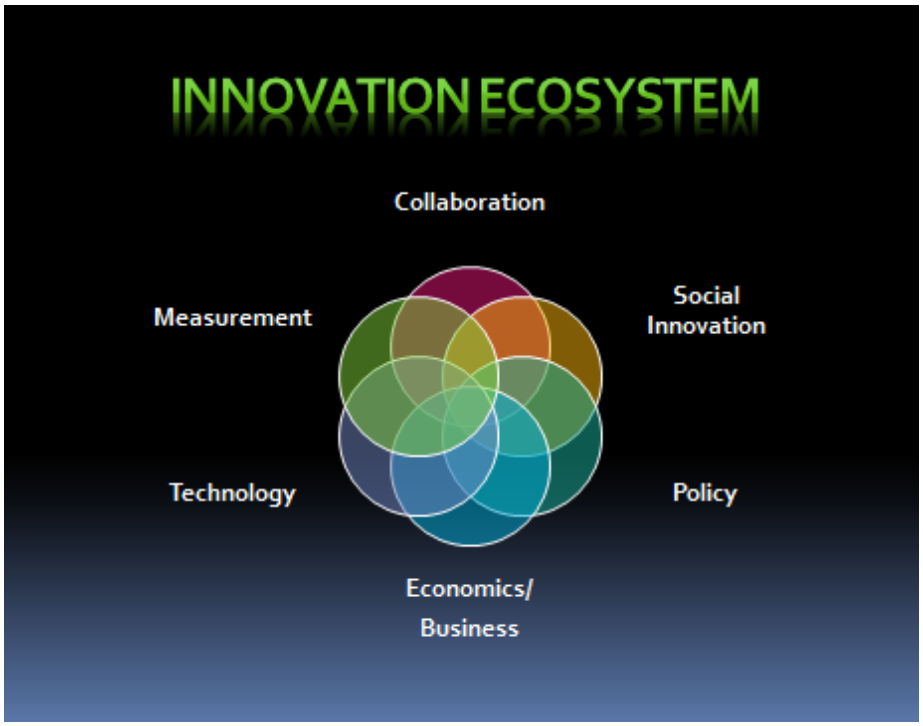


Figure 22 Innovation Ecosystem

Community Food System Transition Tools: Innovation Ecosystem

- **Collaboration**: Driving Change Together for Collective Impact
- **Social**: Cultivating Social Innovation and Breaking Down Institutional Barriers (Rules, Values and Lifestyles)
- **Policy**: Developing Food and Farm Friendly Policy
- **Economics/Business**: Building the Business Engine by Calculating the Dollars and Sense
- **Technology**: Supporting Sustainable Technological Innovation Including Embedding Agroecology and Biodiversity to Build Resilience and Value Nature
- **Measurement**: Measuring Success and Impact

Creating an ecosystem implies action that can be shared across sectors in a collaborative way. It implies that action is not just expected of government, but that everybody has a role to play.

Figure 23 Innovation Ecosystem in Detail

Ten Community Good Food Ideas

These are ideas that are ready to go or have already been incubating or developing in the market or in the community. It might be something that the community has identified as a deficit. In some communities that might include a community food centre, community kitchen and a community farm or a waste program. These ideas will be fully developed from the community and formalized in the food system assessment. Every community will have a different geography, climate, population that will affect what it can grow and what its food needs are. Every community will have different assets; for example, if the community has a community food centre or a grain mill or other hard or soft infrastructure, then that won't be a focus. It is very subjective to the community's needs and current assets.

Community Food System Transition Tools: Ten Community Good Food Ideas (Example developed for Caledon, Ontario)

1. Increase **Vegetable and Fruit Farms** to build the local supply.
2. Encourage **Craft Beverages (both alcoholic and non-alcoholic)** to build the local supply.
3. Support **Edible Education** for all generations of eaters.
4. Encourage **Value Add Production** to diversify products and increase food business opportunities.
5. Facilitate necessary development of **Food and Farm Facilities or Hard Infrastructure for BOTH Community and Business** to support food system development.

Community Food System Transition Tools: Ten Community Good Food Ideas (continued)

6. Facilitate necessary development of **Soft Infrastructure for BOTH Community and Business** to help build programs and marketing for the local food system.
7. Encourage and mandate new **short supply chains** for institutional and direct to consumer food procurement.
8. Continue to develop **Agri and culinary tourism** to diversify the market for local products**.**
9. Account for **Ecological Goods and Services** from agriculture and food to develop additional.
10. Encourage existing **Conventional Producers** to take advantage of local market opportunities.

Inspired Sustain Ontario's *Menu 2020: Ten Good Food Ideas* (Baker, Campsie, & Rabinowicz, 2010)

Figure 24 Community Good Food Ideas

5.4 Chapter in Review

This process or transition pathway has been developed to provide a normative framework for transition that builds on the theoretical and conceptual foundations of system change and sustainability transitions. The process was designed to build on existing theoretical foundations and to develop new contributions or interpretations that have practical applications. This has been done with both of the following tools: developing an innovation ecosystem and using community good food ideas to serve as a keystone concept. In addition, two transition frameworks (Efficiency/Substitution/Redesign and Multi-Level Perspective) were blended to help develop an understanding of the intensity

and scale of transition over time. With full development of this model, it is envisioned that an intensity ranking system could be developed base on giving actions a ranking according to intensity by environmental, social and economic action. Then the action could be plotted according the level in the multi-level perspective. In this case the multi-level perspective has been expanded more in the tradition of panarchy with the following levels: individual, organization, value chain, community, province, country and international. In addition, it could also be plotted a separately time based on in the tradition of a multi-level perspective of niche (micro), regime (meso) and landscape (macro) level. Ideally there would be a way to conceptually blend these two perspectives of level.

Part I of this research project served to develop an understanding of community food system transition to sustainability based on theory, concepts and lessons from the field. The original research problem or as in social innovation, the "wicked question" driving this project can be summarized by the following:

How can innovation drive change for communities (individuals, government, business and civil society organizations) to transition their current food system to one which is healthy, ecological, equitable and financially viable and balance these attributes with efficiency and economy while not producing negative externalities?

Since each community is different based on strengths, weaknesses, opportunities and threats, there is no one solution to this problem. It will be different in every community. Therefore, in order to solve this problem and answer this question, a ten step transition process and transition tools have been developed transition to guide communities to transition to a balance sustainable localized food system. Part II of the project lays out these transition tools in sequence for the community of Caledon.

Part II: Community Food Plan for Caledon to Foster Community Food System Transition to Sustainability

Chapter One: Introduction

The purpose of Part II of this research is to begin to apply and tailor the transition tools for an actual community. With extensive experience in the Town of Caledon and Headwaters Region, it is most logical to use Caledon to action this research. This part lays out the process for Caledon to develop a Community Food Plan. The transition tools have been customized for Caledon. Chapter Two sets the stage for the plan development by explaining and documenting background information on Caledon and why it is ideal for community food system transition. Chapter Three details the process and customized transition tools for Caledon to develop a community food plan. Chapter Four summarizes the next steps and how the project could move forward.

Chapter Two: Community Food Plan Development Background

Caledon Ontario is a prime candidate for developing a community food plan because it is a small town (population of approximately 65,000 in 2016) and set on the picturesque rolling hills of the Niagara Escarpment and Oak Ridges Moraine with a flat section known as the Peel Plains. With almost two-thirds of Caledon's land base of almost 700 square kilometres protested by Ontario's Greenbelt and the other one-third in the unprotected whitebelt, Caledon has an interesting future ahead.

Caledon is within close driving range of almost nine million people who live in the GTA. With the trend to local food and countryside experiences, Caledon is well-poised to attract visitors to the Town. This is especially true with millennials who embrace the latest food trends and who are interested in experiences. With a strong environment and arts community, abundant trails, equestrian opportunities, Caledon should continue to cater not only to local residents, but also to tourism. All of these factors bode well for the development of a strong community food system that serves local residents and visitors and dovetails with other types of green commerce and tourism in the Town.

Municipally, Caledon is the smaller town in the northern end of Peel Region which also includes the cities of Mississauga and Brampton. As a growing diverse community, the Region of Peel and its location in the Greater Toronto Area provides access to a large potential audience of visitors. While Caledon has been proactive in working with the agricultural community through economic development and the Greater Golden Horseshoe Food and Farming alliance, traditional pressures for economic development prevail. Yet the emerging local sustainable food and farm sector is visible with two established cideries and two to three new breweries established in the past two years. There are two on-farm markets based on beef production, with butchers and chefs on site. The markets have a full selection of ready-made meals and other products. Caledon is the home to two regular farmers' markets and a third one that is less regular. Caledon has several farm-to-table restaurants. It has two small grocery stores (Foodland and an independent called Garden Foods) which have strong buy Ontario policies. There are a growing number of value-added producers like Soup Girl (vegetarian soups) and Davis Feed and Farm Supply (honey and sunflower oil). Caledon is home to the following three key community based food and

agriculture facilities: Albion Hills Community Farm (food, education and community gardening and also on conservation lands); Palgrave United Community Kitchen (culinary and food programs and food business incubation); and, The Exchange Community Food Centre (food access and education).

However, the agriculture community is predominantly conventional agriculture including grain, corn and soybean crops, with a diminishing dairy sector and a stable chicken farm sector. Equestrian farms have a strong presence in Caledon. There are three main nursery operations. In the last ten years, Community Supported Agriculture (CSA) operations have been established. There is a strong agri-tourism sector with four pick-your-own apple orchards, one pick-your-own strawberry operation and one pick-your-own fruits and vegetable operation (strawberries, tomatoes, peas peppers, eggplant, rapini, etc.).

The Region of Peel has a farm fresh map program called Grown in Peel (paper map and website) and they have published a map since 2006. Headwaters' Farm Fresh Directory is new for 2017 with a paper edition through In the Hills magazine (website has existed for 2016).

Recently the Headwaters Food Charter and Action strategy was endorsed by the Town of Caledon. This charter builds on almost ten years of work by the community through Eat Local Caledon and then the Headwaters Food and Farming Alliance. The Peel poverty strategy will be releasing a Peel Food Charter later on in 2017. The Town has updated their by-laws to allow value add production on farms.

Caledon has great trails, conservation areas (3), bike routes and small villages to attract more of a rural creative culture and tourism. With Headwaters Region, it has a strong tourism presence through Headwaters Tourism.

Caledon Ontario (caledon.ca)

Caledon is home to a diverse assortment of over 1,700 businesses, industry leaders' benefit greatly from Caledon's enviable position within the Greater Toronto Area (GTA). Located just minutes from North America's fifth largest urban area, labour pool and transportation hub, Caledon offers ready access to regional, national and international markets. This town of almost 70,000 residents has also earned a reputation for providing a safe, stable and sustainable environment for its private and corporate residents and has been named "Ontario's Greenest Community" AND "Canada's Safest Community" by independent media outlets on multiple occasions. Caledon also boasts one of the largest inventories of planned and shovel-ready industrial lands in the GTA as well as access to an assortment of programs that provide financial assistance and relief to companies that adopt environmentally-friendly development and operating practices. With its safe and green environment, desirable location, and healthy allotments of planned or shovel-ready industrial lands, Caledon is well on the way to establishing itself as one of Canada's most desirable business centres, and is poised for tremendous industrial growth across all sectors.

Figure 25 Caledon Economic Development and Business
(Town of Caledon, 2017)

Caledon is ready for increased food action and a food transition process. A recent transition in economic development could mean that the Town is ready for a new focus and a shift away from the more traditional focus apparent in Figure 24, above. The staff is keen on agriculture and the business development department has a great deal of collective

experience working with agriculture, regional agriculture, farmers' markets, Headwaters Food and Farm Alliance and tourism. Four of nine councilors and the Mayor are part of agriculture families and three run farm operations. The climate and timing is good for proposing a transition to sustainable agriculture process; a process that would increase the presence of agriculture in the community and support many other businesses at the same time.

The following chapter details the process that will be used to mobilize support and engagement around transition and developing a community food plan.

Chapter Three: Community Food Plans and Transition Tools for Caledon

This chapter presents the proposed process and tools for Caledon to work on transitioning its food system to sustainability. Six customized transition tools are presented including:

- A detailed ten step community plan process ***for Caledon (see Figure 25***, below);
- Food System Components (see Figure 2***9***);
- Community Food Assessment (see ***Figure 27***);
- Design Principles (see Figure ***28)***;
- Innovation Ecosystem (see Figures ***30 and 31)***; and,
- Community Good Food Ideas ***(see Figure 32*** below).

Each of these tools gives simple directions on how to complete the step and they are detailed in the following pages. It is recommended that these tools could be further customized and presented to Caledon Staff and Council, local business, community organizations and interested citizens.

The Transition Process

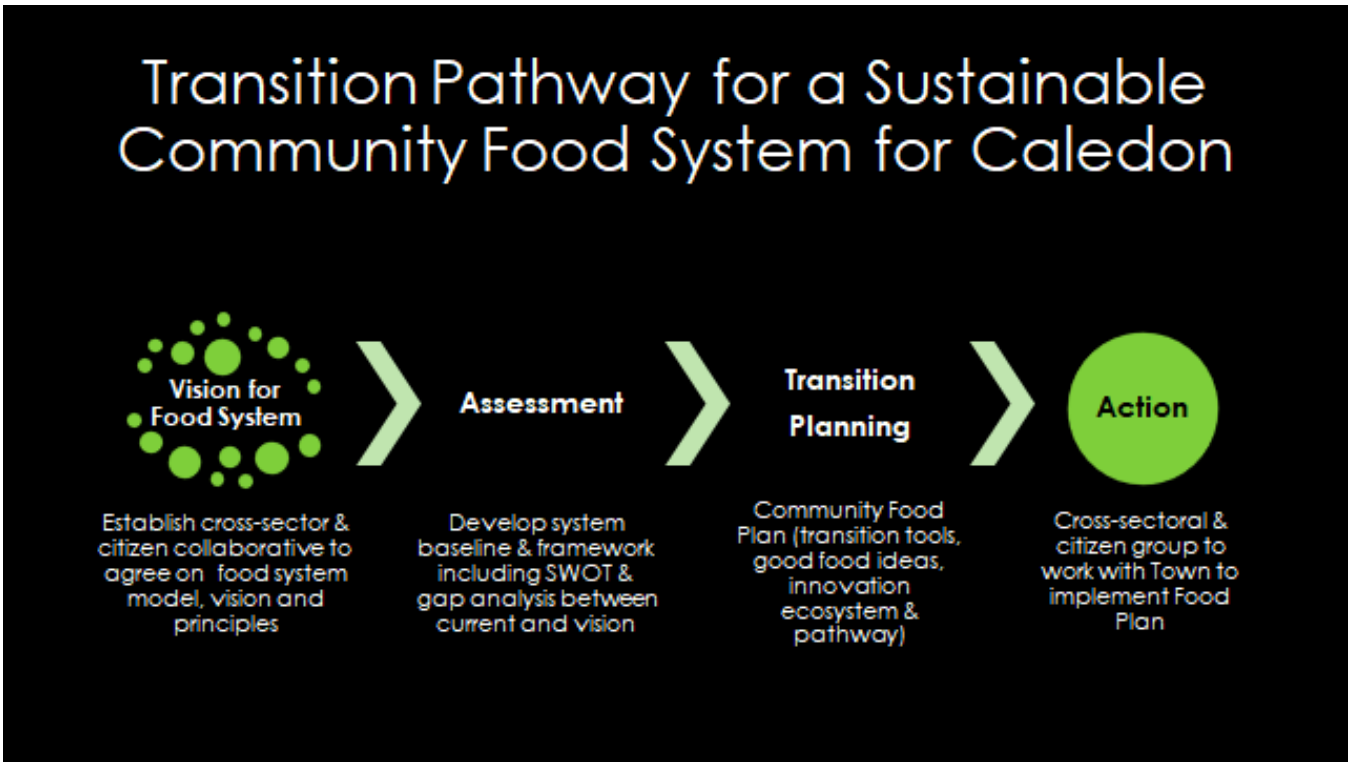


Figure 26 Transition Pathway for Caledon

The transition pathway for a sustainable community food system for Caledon is illustrated in Figure 25 above. This overview of the process is provided to give food system actors and others a snap shot of what is involved. A detailed ten step process is outlined in Figure 26 below. The detailed process lays out a transition pathway to develop a Community Food Plan Using the transition tools for Part I. For Part II, the transition tools have been customized for Caledon.

Community Food Plans: Ten Step Process for Caledon

Community Food Plan for Caledon: A Ten Step Transition Process and Pathway to a Sustainable Food and Farming System

1. **Cross-Sectoral Group:** Establish cross sectoral and citizen group to represent food system stakeholders to be called the Food Committee. Should include representation across food and farm system from business, government, civil society organizations and citizens. Establish a core management groups for the process to develop the community food plan.

2. **Preliminary Food System Model, Vision and Goals**: Group should agree on a preliminary food system model (including components), vision and goals. It is crucial that the food system components be mapped out and delineated as a key first step (see Figure X as an example of a food system from Calgary). As the process moves along these will also build into design principles and data points for system goals and vision. This phase should be informed by background information on what other local communities have done and other community food system models.

3. **Food Assessment, Asset Mapping and Policy Review:** A food system assessment, asset mapping and a policy review need to be completed.
    e) Assessment should include: vision and approach, including methodology; food system profile; food system component review by each individual component including a baseline state and SWOT for each; measurement and gap analysis; and, roles for action.
    f) Asset mapping to map out the community system.
    g) A policy review to provide a snapshot of the roles and regulatory bodies in the community food system across federal, provincial and municipal levels and in the municipal role in the food system by department.
    h) This phase may require funding and an outside consultant to complete the work in conjunction with the food committee.

4. **Innovation Ecosystem:** Create an innovation ecosystem to support, nurture and incubate new food businesses community food agencies and organizations. The ecosystem will create the environment that supports and welcomes innovation across the sector. It will involve developing programs and physical spaces dedicated to innovating in the food and farm sector. The ecosystem's core components will include:
    g) Collaboration: Driving Change Together for Collective Impact
    h) Social Innovation: Cultivating Social Innovation and Breaking Down Institutional Barriers (Rules, Values and Lifestyles)
    i) Policy: Developing Food and Farm Friendly Policy
    j) Economics/Business: Building the Business Engine by Calculating the Dollars and Sense
    k) Technology: Supporting Sustainable Technological Innovation Including Embedding Agroecology and Biodiversity to Build Resilience and Value Nature
    l) Measurement: Measuring Success and Impact

Community Food Plan for Caledon: A Ten Step Transition Process and Pathway to Sustainability (Continued)

5. **Collective Impact Model:** The food committee to commit to adopting a collective impact model to move forward the community food system work. The group will also need to agree on: a common agenda; shared measurement system; mutually reinforcing activities; continuous communication; and, backbone support. This will involve having one organization or government body managing the work of the group as a backbone organization.

6. **Community Engagement:** The food committee will need to embed community engagement as part of the process at different times so that ownership of the work is shared across the community.

7. **Design Principles:** With the results of the assessment, the committee will need to establish design principles to guide the work at a high level. Most system participants should be able to adopt the principles and translate them to their individual work at an appropriate level.

8. **Community Good Food Ideas:** With the results of the assessment, the committee will need to formulate community good food ideas to provide a place to start working and build on existing work already being done in community or new work that will fill an identified gap.

9. **Coordinating Resources and Timeline:** This process will likely require a full time dedicated coordinator that will resource the food committee and ensure the work keeps moving. It is expected that this transition process will take from 24 to 36 months to develop and begin implementation of the community food transition plan. It is expected that communities will develop policy tools that could change existing by-laws and build on existing food charters and strategies. It is expected that strategies, infrastructure (hard and soft) and other community development plans will be initiated. It is expected that the process will inspire the community to develop and build on these plans so that the sky is the limit and the possibilities are endless.

10. **Transition to Sustainability:** Transition requires considering the **intensity** of the sustainability efforts: staying the same or becoming more efficient or substituting more sustainable innovations/components or redesigning the entire food system. Transition also requires consideration of what **level** the transition will happen at: individual; organization/business; community; province; country; global; or in niche, the main SES (regime) or at the level of institutions and society's rules (landscape).

Figure 27 Community Food Plan for Caledon Ten Step Process

Community Food Assessment for Caledon

A Community Food Assessment is a foundational research document to provide communities with the information they need to move forward on transition.

Community Food System Transition Tools: Community Food Assessment for Caledon

- Create a collaborative community food network or committee with those involved in the food system including government, business, civil society organizations and citizens – a group who can commit to the work and may have a vested interest in success.
- Commit to completing a community food assessment to provide a baseline understanding of the current food system
- Decide on the purpose of the assessment including a collective vision for a sustainable food system, a community food system model and effective principles.
- Develop a comprehensive baseline and framework of the current food system including issues opportunities and practices from other jurisdictions
- Provide a gap analysis between current system and vision
- Create a community action plan to identify implementable and locally appropriate recommendations to address food system issues.

Note: These ideas have been guided by the Calgary Food System Assessment and Action Plan (City of Calgary, 2012).

Figure 28 Community Food Assessment for Caledon

Effective Principles to Guide Transition for Caledon

Effective Principles to Guide Transition and provide the food system participants with common goals in a cross-sectoral environment.

Community Food System Transition Tools: Proposed Effective Principles to Guide Transition for Caledon

- Ensure all residents have access to healthy, affordable food options;
- Minimize environmental impact of food production and transport;
- Facilitate and encourage local food production and processing;
- Create local jobs that provide fair working conditions and a living wage;
- Benefit local economies by supporting local food producers, retailers and businesses;
- Maximize food resources for human consumption and minimize waste through re-distribution and reuse (compost)
- Educate all residents, business and government on food literacy
- Connect and engage citizens and cross-sectoral groups to build community
- Build local infrastructure and community capital

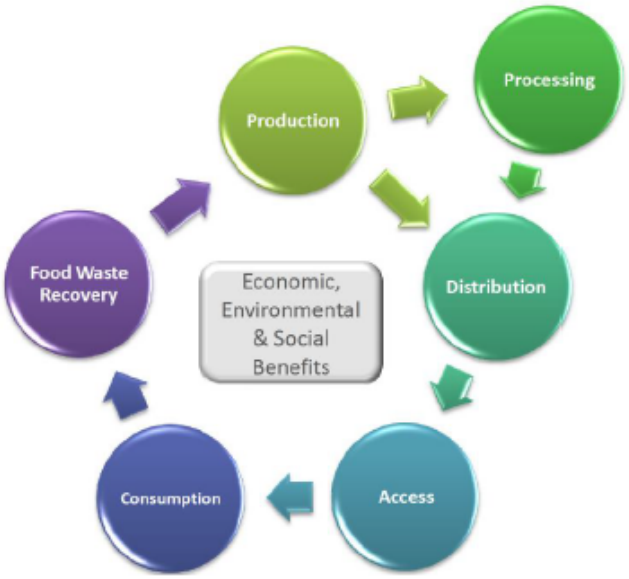
Note: These principles have been guided by the Sustainable Cities Institute who state a version of some of these principles as key issues. **Invalid source specified.**

Figure 29 Proposed Effective Principles to Guide Transition for Caledon

Potential Caledon Food System Components to Define the System for Transition

Production: refers to the planting, growing, raising and harvesting of food, including urban and rural agriculture.

Processing: refers to the process of altering raw food stuffs to create a different, more refined product. Examples include preserving, cooking, baking, preparation, meat processing, grain milling and other value-adding operations at a variety of scales. All these changes require the use of energy and natural resources. Reasons for processing include the need to manage harvests, reduce waste, keep food safe and protect public health, improve palatability, feed large urban populations and feed rural and remote communities.



Distribution: refers to the distribution and storage of both raw and processed food and the retailing, wholesaling and purchasing of food products. This takes place from farms to grocery stores, markets and restaurants. Energy and natural resources are used both in the packaging process and in the transport of both the food and the packaging materials to the places where packaging is completed.

Access: refers to the accessibility and affordability of food in addition to the preparation of both raw and processed food products. This takes place from the farm to grocery stores, to farmers markets, to restaurants, to communities and households. People purchase food based on family need, accessibility, food preferences, cultural background, religion, nutrition, values, attitudes and beliefs related to food and food advertising. Food choices are made within certain constraints such as money available to buy food, time available to shop for food, time available to prepare and cook food, skill and confidence in food preparation and cooking, facilities available in the home and access to shops and transport, likes, dislikes, allergies and cultural factors. Choices are also limited by the food supply.

Consumption: refers to the act of consumption and enjoyment of food. This can include food-related events and eating in both the public and private realms. Being able to select, prepare and cook minimally processed food from low in the food chain enables families to enjoy making healthy food choices, achieve good nutritional value for money, increase control over what they eat, understand where food comes from, begin to appreciate the important role of food producers in our society and contribute to protecting the environment. Preparing and sharing food also plays an important role in developing family and community relationships.

Food Waste Recovery: refers to the diversion, management, and utilization of organic waste e.g. as an energy source and fertilizer using recycled nutrients. Recycling and reusing of food matter provides a valuable resource when considering food choices within the framework of the food system.

Figure 30 Potential Food System Components for Caledon
(City of Calgary, 2012, p. 16)

Innovation Ecosystems for Caledon

Innovation Ecosystems are physical and program places to create, nurture support and incubate innovation that can be developed across all sectors. It is envisioned that citizens, government, business and community organizations would work together to develop an overall innovation ecosystem for Caledon's food system. In addition, each group would develop an appropriate innovation ecosystem for themselves that linked to the broader Caledon one. Figures 30 and 31 give details on the innovation ecosystem.

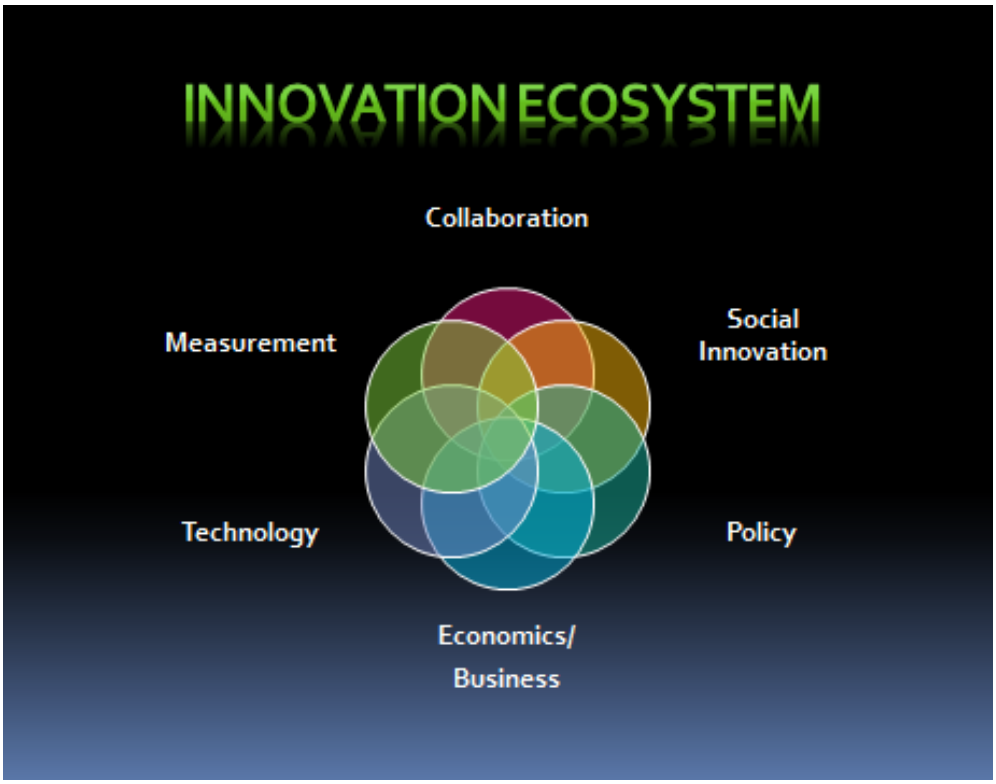


Figure 31 Innovation Ecosystem Diagram for Caledon

Community Food System Transition Tools: Innovation Ecosystem

- **Collaboration**: Driving Change Together for Collective Impact
- **Social**: Cultivating Social Innovation and Breaking Down Institutional Barriers (Rules, Values and Lifestyles)
- **Policy**: Developing Food and Farm Friendly Policy
- **Economics/Business**: Building the Business Engine by Calculating the Dollars and Sense
- **Technology**: Supporting Sustainable Technological Innovation Including Embedding Agroecology and Biodiversity to Build Resilience and Value Nature
- **Measurement**: Measuring Success and Impact

Creating an ecosystem implies action that can be shared across sectors in a collaborative way. It implies that action is not just expected of government, but that everybody has a role to play.

Figure 32 Detailed Innovation Ecosystem for Caledon

Community Good Food Ideas

Community Good Food Ideas will lead the transition as places to begin food system transition work. These ideas will vary from community to community depending on the food system and a number of other factors. It is important that the community should develop these ideas where energy, funding and momentum will drive them forward. In Caledon craft beverages are developing rapidly and they seem to have momentum. This was indicated by the first annual Caledon Craft Beer and Cider Festival in 2017. With numbers and momentum, additional Provincial and Federal funding can often be obtained. All of this helps the food system to move towards transition. It is necessary to work on a number of ideas at once as some could slow down or stall and others could take off.

Community Food System Transition Tools: Ten Community Good Food Ideas for Caledon

1. Increase **Vegetable and Fruit Farms** to build the local supply.
2. Encourage **Craft Beverages (both alcoholic and non-alcoholic)** to build the local supply.
3. Support **Edible Education** for all generations of eaters.
4. Encourage **Value Add Production** to diversify products and increase food business opportunities.
5. Facilitate necessary development of **Food and Farm Facilities or Hard Infrastructure for BOTH Community and Business** to support food system development.
6. Facilitate necessary development of **Soft Infrastructure for BOTH Community and Business** to help build programs and marketing for the local food system.
7. Encourage and mandate new **short supply chains** for institutional and direct to consumer food procurement.
8. Continue to develop **Agri and culinary tourism** to diversify the market for local products**.**
9. Account for **Ecological Goods and Services** from agriculture and food to develop additional.
10. Encourage existing **Conventional Producers** to take advantage of local market opportunities.

Inspired Sustain Ontario's *Menu 2020: Ten Good Food Ideas* (Baker, Campsie, & Rabinowicz, 2010)

Figure 33 Community Good Food Ideas

Outline for Further Research and Presentation of Community Food Plan Process for Caledon

Additional research and presentation work, which was beyond the scope of this research, could be completed to fully develop these transition tools and the community food plan process for Caledon. This could include a presentation style report with the following outline:

Executive Summary
Chapter One: Introduction
Chapter Two: Moving Towards a Sustainable Food and Farm Future
Chapter Three: Design Principles to Guide Food and Farm System Change
Chapter Four: Community Profile
Chapter Five: Food and Farm Assets
Chapter Six: Food and Farm System Transition Pathway
- 6.1 Designing Food System Principles
- 6.2 Deciding on a Food System Model
- 6.3 Using an Innovation Ecosystem Approach
- 6.4 Developing Promising Community Food Ideas
- 6.5 Undertaking Transition Planning
- 6.6 Implementation Strategy

Chapter Seven: Next Steps

Chapter Four: Next Steps

The next step for this project should be further research and customization of the community food plan process and transition tools specifically for Caledon. This should be then developed into a custom presentation for Caledon Staff and Council. In addition, community meetings should be organized to move this work forward and involve the community. Both should be done in conjunction with existing food and farm community groups and businesses active in the local food economy. Finally, other communities should be invited to test out and work with the process and tools to help refine them. This will move community food systems forward and help them transition to sustainability.

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